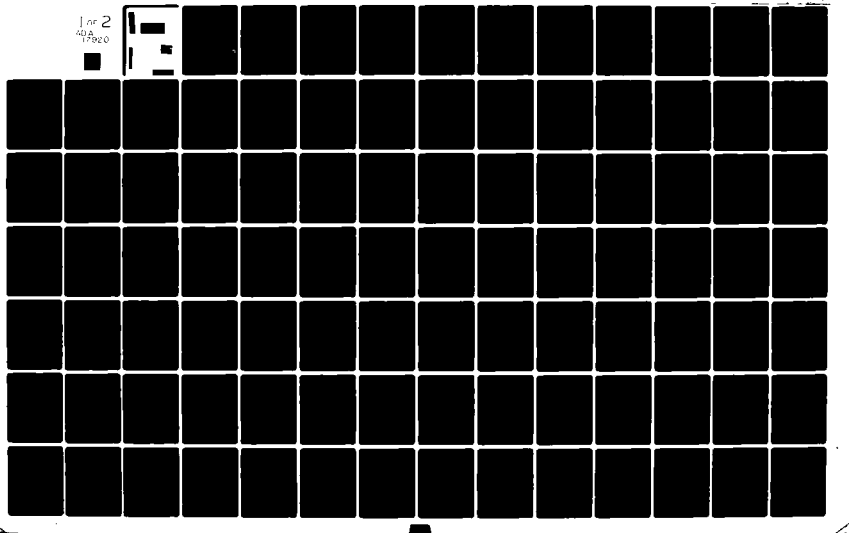
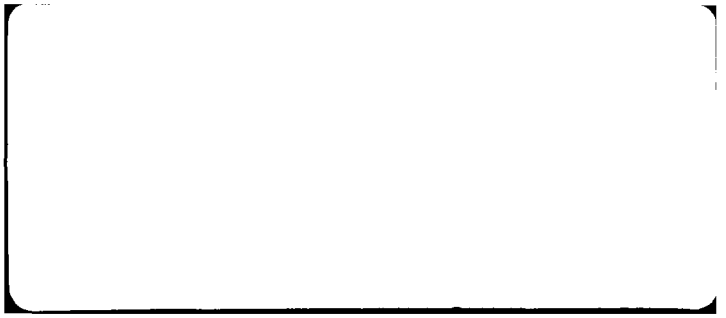
AD-A117 920 INFORMATION SPECTRUM INC ARLINGTON VA F/G 5/9
AVIATION OFFICER REQUIREMENTS STUDY.(U)
MAY 82 F E O'CONNOR N00014-81-C-0368
UNCLASSIFIED ISI-V-2693-01 NL





INFORMATION SPECTRUM, INC.
1745 S. JEFFERSON DAVIS HIGHWAY, ARLINGTON, VIRGINIA 22202 (703) 892-9000

(1)

Aviation Officer Requirements Study

31 May 1982

Contract No. N00014-81-C-0368
ISI Report No. V-2693-01

Submitted to:

Program Director, Operations Research
Mathematical and Information
Sciences Division
Office of Naval Research
800 N. Quincy Street
Arlington, VA 22217

CORPORATE OFFICE
1040 KINGS HIGHWAY NORTH
CHERRY HILL, N.J. 08034
(609) 667-6161

3993 HUNTINGDON PIKE
HUNTINGDON VALLEY, PA. 19006
(215) 947-6060

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: V-2693-01	2. GOVT ACCESSION NO.: AD-A117 920
3. RECIPIENT'S CATALOG NUMBER:	
4. TITLE (and Subtitle): Aviation Officer Requirements Study	5. TYPE OF REPORT & PERIOD COVERED: Final Report
	6. PERFORMING ORG. REPORT NUMBER:
7. AUTHOR(s): F.E. O'Connor	8. CONTRACT OR GRANT NUMBER(s): N00014-81-C-0368
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Information Spectrum, Inc. 1745 Jefferson Davis Highway Arlington, Virginia 22202	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: NR156-078
11. CONTROLLING OFFICE NAME AND ADDRESS: Program Director, Operations Research Mathematical & Information Sciences Division Office of Naval Research 800 North Quincy St. Arlington, VA 22217	12. REPORT DATE: 31 May 1982 13. NUMBER OF PAGES: 161
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office):	15. SECURITY CLASS. (of this report): Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report)

Distribution of this document is unlimited. Reproduction in whole or in part is permitted for any purpose of the United States Government.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

Same

18. SUPPLEMENTARY NOTES

Supported by Office of Naval Research, Manpower R&D Program

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Officer Requirements
Retention
Career Path Analysis

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A model is presented which develops Aviation Officer Requirements at the sub-community level within the constraints imposed by a network of permissible career paths specified by the user. The model is currently implemented in a WANG 2200 V computer in a "User-Friendly" interactive mode. The user can quickly make multiple runs, varying a number of parameters, to test the implications of various policy alternatives on Aviation Officer Requirements. Demonstration of model application and a model user's guide are included.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 68 IS OBSOLETE
S/N 0102-LF-014-6601

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

TABLE OF CONTENTS

LIST OF FIGURES

AVIATION OFFICER REQUIREMENTS STUDY

I. INTRODUCTION

In the period between 1978 and 1980, the Navy experienced severe shortages of junior and midgrade Naval Aviators. The situation became so critical in 1978 that, for a time, extraordinary management actions were required just to assure a minimal capability to train new aviators in the Naval Air Training Command. These actions included early rotation of fleet pilots to the training command (without replacement) and reduction of postgraduate education quotas for aviators. These kinds of short term responses, while necessary, are highly undesirable in the long term from the personnel management viewpoint. In the dynamic process by which the Navy develops senior officers, it is difficult to compensate for lost opportunities to provide operational experience or education to young officers. While it is theoretically possible to make up for denied opportunities later in an officer's career, in practice this can usually be done only at the expense of some other, more current opportunity. Given such a choice, both the individual officer and the distribution system will generally pursue the current opportunity. The net result is that the Aviation Warfare Officer community will have somewhat less operational experience and a lower level of professional education for some time to come. In addition, changing assignments and early moves have undoubtedly had an adverse impact on both the morale of junior officers and on officer retention.

The problems evident in 1978 were not unique. Surpluses or shortages of Aviation Officers sufficient to cause dramatic changes in distribution patterns have occurred every 5 to 7 years since the mid 1950s. In 1955, there was a shortage of aviators; in 1961, a surplus; in 1967, a shortage; in 1973, a surplus; and in 1979, another shortage. The phenomenon is cyclic and is driven, at least in part, by forces outside the control of manpower planners. However, the increasing severity of these episodes over time suggests that manpower planners have lacked the tools necessary to evaluate the long term impact of their decisions.

The problems described above are further complicated by the fact that the Aviation Officer billet structure is not coordinated with career pattern considerations. The requirements determination methodology should reflect the importance of the character and sequencing of assignments to the development of a viable inventory of officers. Current procedures do not take these factors into consideration. The following sections of this report describe the development of a new manpower planning tool which meets these needs and provide some preliminary examples of its application.

II. MODEL DESCRIPTION

A. Background

In the United States Navy, the statement of officer requirements is multidimensional; that is, the total number of officers required is composed of subsets on two dimensions of interest: grade and speciality. Thus, one may speak of the number of com-

manders required by the Navy, the number of Naval Aviators required, or the number of Naval Aviators who are commanders. To manpower managers, these partitionings of the total requirement are the focal points of requirements determination. Specialities (Surface Warfare, Submarine Warfare, Air Warfare, and the several Staff Corps) are managed separately, and requirements determination within a given speciality is largely independent of consideration of requirements for other specialities. Thus, in the sense that requirements define inventory objectives, it is more pertinent to speak of requirements within a speciality since this is the context in which inventory-requirements relationships are viewed.

A significant consideration in the determination of officer requirements is the fact that nearly all additions to the officer inventory are made at the lowest grade level. Requirements at higher grade levels are filled by promotion from lower grades, and inventory gains to meet numerical requirements must ultimately be achieved through accessions. For the Air Warfare speciality the accession process itself is unusually long, involving an extended recruiting and screening process and a long, costly undergraduate training program. Planning lead times of 2 to 3 years are required. Thus, accession planning is an important adjunct of the Aviation Officer requirements determination process.

A second consideration in the Aviation Officer requirements determination process is the dynamics of inventory management and, in particular, the character of the inventory ageing pro-

cess. Aviation Officers are constantly being lost due to retirement, resignation, and other causes. The nature of these losses at any particular time depends partly on past accessions and, therefore, on past perceptions of requirements. It follows, then, that requirements determination should attempt to account realistically for future losses from current inventories and, where possible, should seek to influence those losses in favorable ways. This requires the introduction of some elements of career planning into the requirements determination process.

A third consideration bearing on the determination of Aviation Officer requirements is the fact that Naval Aviators and Naval Flight Officers are broadly classified by Undergraduate Training Curricula (e.g., Jet Aviator, Radar Intercept Officer, Helicopter Pilot) and by weapon system type (e.g., Light Attack Pilot, Maritime Patrol Navigator). These two characteristics jointly define subcommunities in the Air Warfare speciality. An officer entering one of these subcommunities as a result of training/initial assignment can expect repeated tours in that subcommunity. There is very little migration between subcommunities. This suggests that it would be useful to partition a requirements model by subcommunity in order to ensure that subcommunity requirements are accurately reflected in the total. In addition, such a partitioning is particularly useful in a model that will be used to assess the impact of force level variations on total requirements.

B. The Requirements Statement

Given the considerations discussed in the previous subsection, one can broadly define the structure and content of an

Aviation Office Requirements model as follows:

- o It should be specified at the subcommunity level.
- o It should account for constraints imposed by career path considerations.
- o It should be force level driven.

It will be apparent that the description of the requirements model given above envisions treating each subcommunity as a "slice" of the total requirement. For each subcommunity there is an independent statement of requirements which is internally consistent and exhaustive in the sense that it specifies all of the requirements to be filled by officers in that subcommunity. There is also the obvious requirement that the summation over all subcommunities should unambiguously and exhaustively reflect the total Aviation Officer requirement.

C. Inventory Ageing

In order to properly model Aviation Officer requirements, it is necessary to establish a mechanism to represent the ageing process for the officer inventory. The essence of the ageing process is captured by specifying year to year losses from inventory in terms of continuation rate. Continuation rate for a given cohort is defined as the ratio of the current size of the cohort to the size 1 year earlier. For the Aviation Officer Requirements model, cohorts are identified by their years of aviation service (years since designation as Naval Aviators or Naval Flight Officers).

Figure 1 provides a general representation of the inventory profile resulting from the operation of a set of continuation rates using accession cohorts of constant size. The figure con-

THE AVIATION OFFICER REQUIREMENT

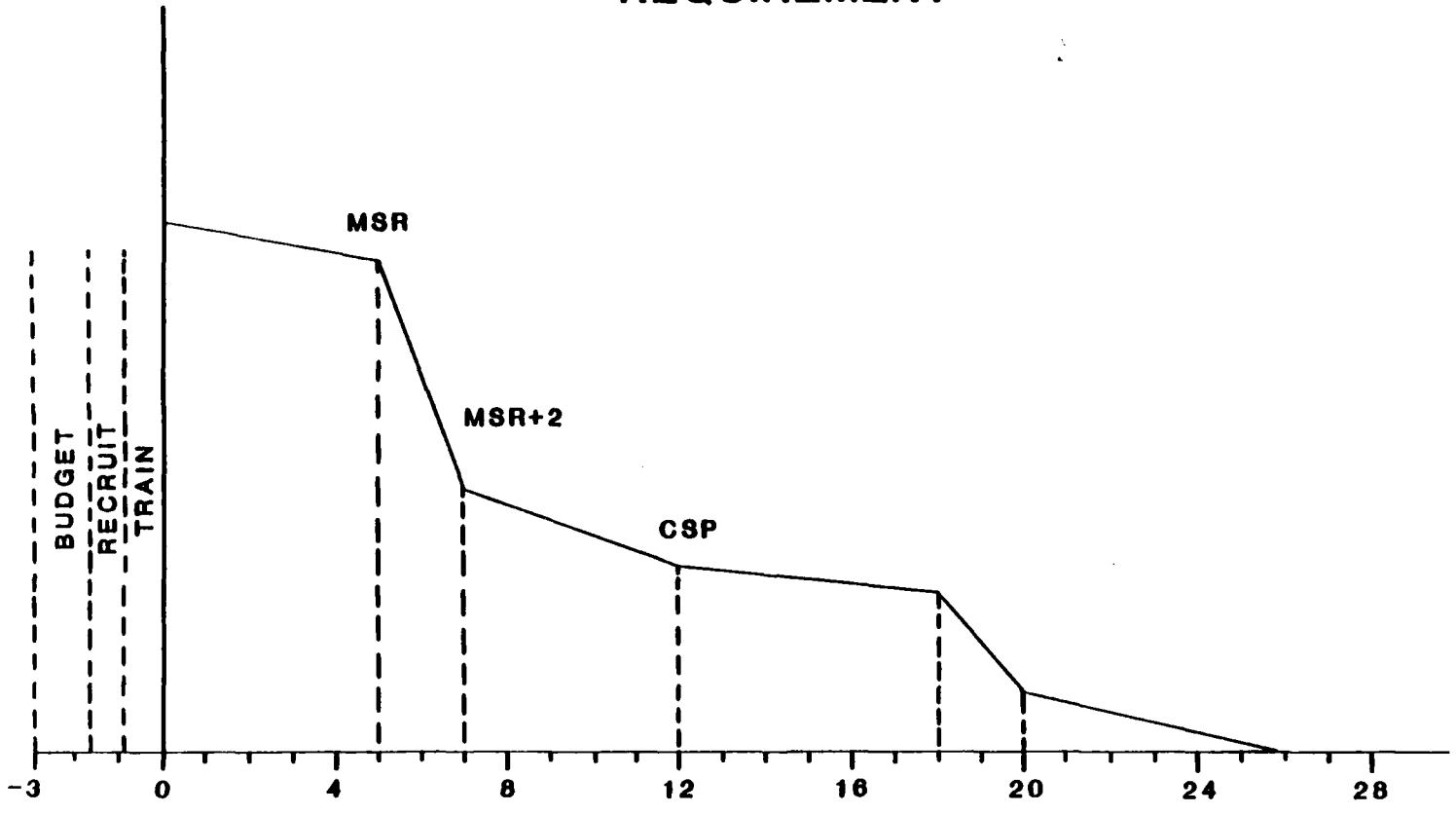


FIGURE 1

sists of a series of straight line segments connecting significant points in the inventory ageing process. This is the inventory component used in the current Aviation Officer Requirements models. The principal features of this component are as follows:

1. Minimum Service Requirement (MSR). Aviation Officers acquire, upon designation, a service obligation which is currently 5 years. An entering cohort will experience a nominal attrition of 5 to 7 percent prior to MSR due to death, disability, c loss of designation.

2. MSR + 2. By 2 years beyond MSR, most of the loss due t expiration of obligated service has occurred. (Retention is measured at this point, and is defined as the ratio of the number of officers remaining at MSR + 2 to the number at MSR - 1).

3. Career Stable Point (CSP). As loss rate moderates beyond MSR + 2, the cohort enters the promotion zone for Lieutenant Commander, which is the first selection involving significant numbers of fail selects. At approximately 12 years, most passed over Lieutenants will have been separated and the inventory will have stabilized to a career force.

4. 18 Year Point. Between 12 and 18 years of aviation service, losses from inventory are generally very low; typically 1 percent per year. At 18 years, passed over Lieutenant Commanders begin to become eligible for retirement (at 20 years of commissioned service). Additionally, at about the same time, Commanders are selected for Captain and, upon promotion, leave the inventory. (Aviation Officer requirements and inventory are

defined as being in the grade of O-5 and below throughout the Department of Defense).

5. 20 Year Point. By the twentieth year of aviation service, losses due to 20 year retirement and promotion have largely been completed and the remaining inventory consists of passed over Commanders. This small number of remaining officers experiences fairly steady losses until year 26, when the mandatory retirement point for Commanders is reached.

It should be noted that the above description conforms to the inventory ageing process as it existed before passage of the Defense Officer Personnel Management Act (DOPMA). There are a number of changes to the rules governing tenure of passed over officers which will probably have a significant impact on the historical inventory ageing process. The inventory profile component in the Aviation Officer Requirements model was implemented to enable incorporation of changes in the ageing process under DOPMA when the nature of such changes becomes apparent.

Manpower planners tend to envision the officer losses implied by the plot of Figure 1 in terms of the single parameter, Retention. A practical requirements model must specify losses in somewhat more detail; in the present case it was decided to use continuation rate. (The continuation rate for year i is the ratio of the number of officers remaining at the end of year i to the number remaining at the end of year i-1). There are thus 26 values of continuation rate corresponding to a given retention statement. This set can be viewed as a vector of individual continuation rates with a component corresponding to each inventory

year. Using the continuation vector, the number of officers remaining in any year can be determined from the number in any other year. This capability is essential for the Aviation Officer Requirements model.

There is still a requirement for a mechanism for converting the single parameter statement of Aviation Officer Retention to a continuation vector. This is done by establishing a nominal continuation vector for a 45 percent retention rate, and providing a mechanism for modifying that vector in response to changes in specified retention and/or MSR, and/or Career Stable Point[1/]. Thus, in the actual implementation of the model, the user can substantially alter the shape of the projected inventory of Figure 1 to allow for examination of the impact of a broad range of values for retention and MSR on Aviation Officer supply.

D. Career Path Network

If the requirements determination process is to adequately

1/ Given a continuation rate of CR_o between 0 years of aviation service and MSR_o, retention R_o and CSR_o for the baseline condition, and a modified condition specified by R_1, MSR_1, and CSR_1, the following changes to the continuation vector will occur:

Between MSR_1 and MSR + 2, continuation rate will be given by

(1) $CR = (R_1/CR_o)^{1/2}$

Between MSR_1, + 2, and CSR_1, continuation rate will be given by

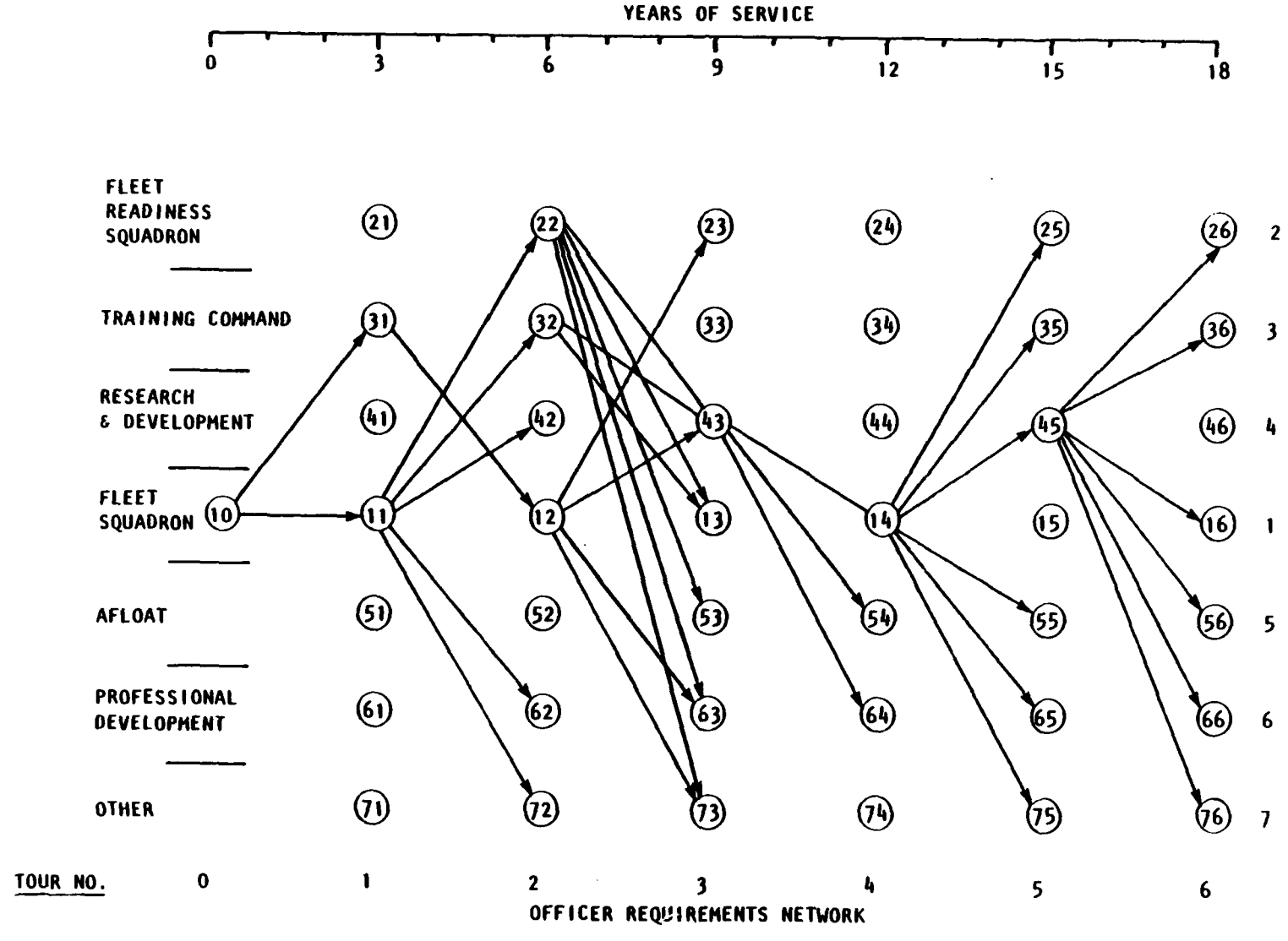
(2) $CR = CR_o((R_o + R)/2R)^{.12}$

The exponent (.12) in formula (2) above was selected to assure that movement of the career stable point is relatively lower than changes in retention. For example, a 33 percent change in retention from .45 to .30 will result in only a 24 percent drop in the size of the 12 year cohort.

account for the process by which senior officers are developed in Naval Aviation, it must incorporate some elements of career planning. This fact has a profound impact on the nature of the requirements statement. The specification of more senior requirements is, among other things, a statement about the history of the inventory ageing process. Thus, the requirement for a Commander demands requirements at all lower grade levels and, more specifically, implies the existence of junior billets involving activities which build the experience required by senior grades.

The Aviation Officer Requirements model accounts for the interdependence discussed above by incorporating career pattern considerations. More specifically, with Aviation Officers partitioned into appropriate subcommunities, a set of acceptable career paths is identified and the network of such paths is defined. Figure 2 is an example of such a network.

Figure 2 presents a mechanism which classifies a given subcommunity of officers by activity and tour. Tour number refers to the sequential position of a given activity in which an officer may be engaged during the series of activities which constitute his career. Tour number increases from left to right in Figure 2 and is given by the second digit of the node numbering scheme shown in the diagram. It should be noted that, although the diagram of Figure 2 presents a time line across the top and displays tours of uniform length (3 years), the actual model accommodates unique tour lengths for each arc of the network.



OFFICER REQUIREMENTS NETWORK

FIGURE 2

REQUIREMENTS NETWORK

The activities shown in the left column of Figure 2 represent a classification of billets in accordance with the general purpose which the billets serve. The definitions of the categories chosen are as follows:

1. Fleet Squadron (FLEET): Those billets required to man fleet squadrons. These account for about 40 percent of Aviation Officer requirements.

2. Fleet Readiness Squadrons (FRS): Those billets required to provide direct support to the operational training of officers and enlisted men within subcommunities. These billets constitute 12 to 15 percent of the total requirement.

3. Training Command Squadrons (TRACOM): Those billets necessary to provide direct support to the undergraduate pilot and Naval flight officer training programs. These account for between 5 and 7 percent of requirements.

4. Research, Development, Test, and Evaluation (RDT&E): Those billets in the RDT&E community which require operational flying by designated pilots or NFOs. They represent between 2 and 3 percent of the total requirement.

5. Afloat: Billets in ships company or on afloat staffs at the numbered fleet level and below. These involve approximately 5 to 7 percent of the total requirements.

6. Professional Development (PRODEV): Student billets in the Postgraduate school or war colleges. These include 5 to 7 percent of total requirements.

7. Other: Billets on major staffs and elsewhere in the shore establishment not otherwise identified above. These comprise 25 to 30 percent of the total requirements.

Table I contains a breakout of these activities with billet levels for pilots and NFOs as they existed at the end of April 1981. It will be noted that the node numbering scheme alluded to above is followed, with the first digit identifying the activity and the second (tour) digit being replaced by an X.

E. Definition of Subcommunities

As indicated previously, the definition of subcommunities is based on weapon system classifications. That is, the traditional classifications of fleet aviation activities such as Fighter Squadrons (VF), Long Range Maritime Patrol (VP), or Helicopter Anti-Submarine Warfare (HS) are used to define communities for which separate networks can be constructed. This approach has several advantages:

1. Since the orientation is to fleet weapon systems, the process of examining the impact of fleet force level changes on total requirements is greatly simplified. For example, one can assess the impact of increasing or decreasing the number of fleet fighter squadrons by analyzing the effect on one network in the model.

2. Direct training requirements (Fleet Readiness Squadrons) which constitute a significant part of total requirements can be associated with the appropriate weapon system.

TABLE 1

Definition of Activities for
Aviation Officer Requirements Model

Activity	Node Numbers	Approximate Level		
		Pilots	NFO	Total
1. Force and Force Support Squadrons[1]	1X	4112	1959	6171
2. Fleet Readiness Squadrons[2]	2X	1249	512	1761
3. Training Command Squadrons[3]	3X	824	78	902
4. RDT&E	4X	284	115	399
5. Afloat (Ships Company/ Afloat Staffs)[4]	5X	548	238	786
6. Professional Development (PG School/War College)[4]	6X	327	136	463
7. Other (Staff/Shore)[4]	7X	2812	1106	3918
Total		10256	4144	14400

Notes: [1]/Includes 473 LAMPS MK III Billets not in current authorizations.

[2]/Includes FRS Student Billets.

[3]/Includes Aviation Schools Command.

[4]/130X Billets Allocated 70/30 to Pilot/NFO.

3. The conventional classification of pilots and NFOs by initial undergraduate training pipeline is preserved. This allows accurate allocation of instructor billets attributable to Undergraduate Pilot Training (UPT) and Undergraduate Naval Flight Officer Training (UNFOT) requirements.

In general, defined communities are distinguished by a common crew composition (number of pilots and/or NFOs in the crew) and crew factor (number of crews per assigned aircraft). These parameters allow the convenient specification of changes in Aviation Officer requirements as a function of changes in force level down to the individual aircraft. Some squadrons, notably Fleet Composite Support Squadrons (VC, HC) and Transport Squadrons (VR, VRC), operate multiple types of aircraft with differing crew compositions. Crew factors are not meaningful for these communities. In these cases Aviation Officer requirements are stated explicitly by grade and designator. For the purposes of this modeling effort, these squadron types are aggregated into three communities designated Force Support (jet), Force Support (prop), and Force Support (helicopter).

Table II lists the communities covered in the model and provides some statistical data regarding community size and composition as reflected in current manpower authorizations. It should be stressed that the inclusion of statistical data on subcommunity size is only intended to provide estimates of scale. In constructing network models for these subcommunities, the data are generated using numbers of squadrons and crew factors.

TABLE II

AVIATION OFFICER REQUIREMENTS BY SUBCOMMUNITY

COMMUNITY	TYPE AIRCRAFT	SQUADRONS	CREW FACTOR	REQUIREMENT		
				PILOT	NFO	TOTAL
LIGHT ATTACK (VA)	A7E	24	1.42	450	-	450
FIGHTER (VF)	F4J/F14A	24	1.17	353	352	705
MEDIUM ATTACK (VAM)	A6E	12	1.14	200	198	398
AIR EARLY WARNING (VAW)	E1B/E2C	12	1.66	131	182	313
TACT ELECT WARFARE (VAQ)	EA6B	9	1.5	83	189	272
ANTI-SUBMARINE WARFARE (VS)	S3A	11	1.44	214	214	428
HELICOPTER ASW (HS)	SH3	11	1.66	242	-	242
CV SUBTOTAL		103		1673	1135	2808
LIGHT HELI-COPTER ASW (HSL)	SH2/SH60	14	2.0	745	-	745
MARITIME PATROL (VP)	P3C	24	1.33	931	597	1528
ELECT WARFARE/ COMM (VQ)	EA3B, EP3A EC130	4	-	142	173	315
FORCE SUPP JET (VR, VC)	C9B, C2A, A4	13	-	373	25	423
FORCE SUPPORT PROP (C130)		2	-	50	29	79
FORCE SUPP HELO (HC, HM)	H47, H53	8		298	-	298
GRAND TOTAL		168		4212	1959	6171

Table II contains 13 subcommunities. Four of these contain only pilots so that there are potentially 13 pilot networks and 9 NFO networks associated with this partitioning of the Aviation Officer population. This is the subcommunity set used for model development.

Employment of the general model structure defined above requires identification of the network arcs which Aviation Officers can occupy and specification of tour length for the permissible arcs. While the computer program has been designed to allow variation of these specifications from run to run, there is a basic network configuration to which the model defaults in the absence of user specification. The configuration was established in consultation with OP132 and OP59, and represents the current operation of the Officer Distribution System with respect to Aviation Officers. The general rules of officer employment used to define that configuration are:

- Fleet Readiness Squadrons are manned only by officers coming from Fleet Squadrons.
- All Officers begin second fleet tour no later than the twelfth year of service.
- Plowback Instructors in the Training Command are guaranteed a subsequent fleet tour.
- Officers can only have one training command tour.
- A maximum of two successive out-of-cockpit tours are allowed.
- Split Tours (Fleet Squadron-Afloat or Afloat-Fleet Squadron) are not allowed.

In addition to these rules, it became apparent that a distinction is drawn between Commanders who have not yet had

squadron command and those who have. Demand for post command tour officers is high for afloat assignments and for many staff positions. In order to ensure that the model will be able to examine Commander requirements in this context, a seventh tour was included to embrace all possible assignments beyond the sixth tour (approximately 18 years of Aviation service).

The effect of the above rules is to reduce the number of permissible arcs from the maximum of 301 to 173 in the final career path network. Since it is not feasible to clearly depict this number of arcs in a network diagram, Table III has been prepared to illustrate, for each node in the network, the permissible precedent nodes. Thus Table III actually represents a three dimensional array covering activity, tour number, and precedent (source) activity. A table similar to this, but including tour length and tour end time, constitutes the central record file of the computer program.

F. Methodology

The original approach to solution of the network problem envisioned the specification of a set of simultaneous equations with arc capacity as the variable, and the solution of that set identifying the structure and magnitude of the requirement. The process of defining that equation set begins with identification and quantification of relationships between activities on different arcs (Planning Factor Data), specification of loss functions and node balance relationships and, finally, identification of policy variables which specify constraints on personnel employment (e.g., Proportion of Population attending Postgraduate

Table III

Career Path Network Specification

TOUR

Precedent Nodes

	1 1234567	2 1234567	3 1234567	4 1234567	5 1234567	6 1234567	7 1234567
1 Fleet	OXXXXXX	XOXXXXX	XXOXXXO	XXXXXXO	XXXXXXO	OXXXXXO	OXXXXXO
2 Fleet Readiness Squns.	XOOOOOX	OXOOOOX	OXOOOOX	OXOOOOX	OXOOOOX	OXOOOOX	OXOOOOX
3 Training Command	OXXXXXX	OXXXXXX	XXXXXXO	OXXXXXX	OXXXXXX	OXXXXXO	XXXXXXO
4 RDTE	XOOOOOX	OXOOOOX	OOOXOOX	OOXXOOX	OOOXOOX	OOOXOOO	OOOXOOO
5 Afloat	XOOOOOX	XOOOOOX	XXOOXOO	XOXOXOO	XOOOXOO	XOOOXOO	OOOOXOO
6 Professional Development	XOOOOOX	OXOOOOX	OOOOXOO	OOOOXOO	OOOOXOO	OOOOXOO	OOOOXOO
7 Other	XOOOOOX	OXOOOOX	OOOOOOX	OOXOXOO	OOOOOOX	OOOOOOX	OOOOOOX

X - Barred source
O - Permitted source

Education). Theoretically, enough equations can be written to provide one for each arc capacity; however as the number of arcs grows this approach becomes less practical for a number of reasons:

1. As the activity structure becomes progressively more finely specified, the rules governing the flow of personnel become increasingly complex. Thus one finds that it becomes more difficult to specify policy statements which are generally agreed to just when the increasing number of arcs demands additional statements.

2. More significantly, as the number of arcs increases the manpower on any given arc decreases. For the network defined above (173 arcs), the manpower on most arcs for most communities will consist of only a few bodies. Cumulative rounding errors as arc capacities are adjusted to reflect whole numbers of officers can be quite large and may represent a significant portion of the requirements statement.

To overcome these difficulties, the approach to solving the network problem was changed. An iterative approach was adopted which creates inventory in response to specific requirements and distributes that inventory. Specifically, the routine adopted begins by identifying the requirement for Squadron Commanding Officers. It then creates a 26 year inventory which results in a sixth tour entry flow exactly matching this requirement. This inventory is then distributed, beginning with the first tour, following the policy constraints adopted and the flow discipline imposed by the network.

This initial inventory generally will not meet all subcommunity requirements. Subsequent iterations then add accessions sufficient to produce an inventory matching the unfilled portion of the requirement.[2/] Iteration continues until the accession requirement falls below 1. Figure 3 illustrates the general logic employed to accomplish this. The iteration process is actually run in two stages. Initial requirements testing focuses on the six specific activities of the model (Fleet, FRS, Training Command, RDT&E, Afloat, and PRODEV). Testing at the end of each iteration focuses on these activities, and the incremental increase in accessions is based on the unfilled portion of requirements. When the requirements in the six specific activities have all been satisfied, testing at the end of each iteration shifts to the unfilled portion of the "Other" requirement. This provides an opportunity to examine the requirements statement as it would exist if all specific requirements were met while limiting support of the "Other" requirement to that which can be met by the slack man-years available in the resulting inventory.

In filling the career path network with the available inventory of officers, the model is constructed to begin by assigning the defined accession cohort in accordance with network constraints. Following this, flows out of the arcs in the network

---

2/ Given an unfilled Requirement, R, the accession level, A, required to meet it (assuming an even distribution over time) is:

$$A = 2R/\left(\sum_{i=1}^{n}\left(\prod_{k=1} C_k\right) \times (1+C_{i+1})\right)$$

Where C_i = The continuation ratio from year i-1 to year i.

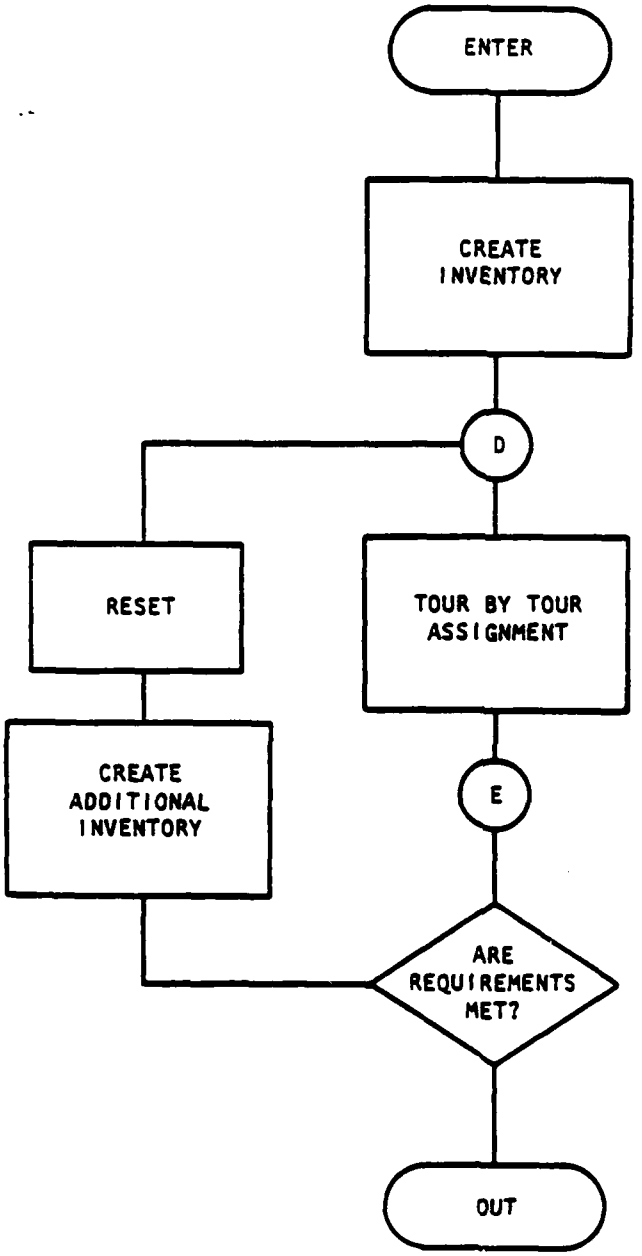


FIGURE 3

OVERALL COMPUTATION SCHEME
AVIATION OFFICER REQUIREMENTS MODEL

are assigned to subsequent network arcs. This procedure is followed on a tour by tour basis over the seven tours of the model. In essence the model emulates the officer distribution process, representing officer flows from tour to tour in the network while observing career path constraints and accounting for losses from inventory 3/.

A straightforward algorithm is used to establish flows within a tour. Figure 4 illustrates the set of nodes for a specific tour (J) and identifies the indexing scheme used in the model. The figure shows the geometry of the problem on the left, and on the right provides an example of the entries which might appear in the career path network matrix. These entries give the tour length in months in the first two positions. Following this are seven entries representing the respective arc capacity for arcs from source nodes N=1, N=2, etc. The entry "NNN" specifies

---

3/ In general, the number of officers available for assignment at the output of a tour (e.g. arc ij) will be given by:

$$F_j = F_i \times \prod_{K=1}^{TL} R_t + K$$

Given this flow, the number of officers in the arc is:

$$C_{ij} = \frac{F_i}{2} \times (1+R_{t+1}+R_{t+1}(1+R_{t+2}) + R_{t+1}R_{t+2}(1+R_{t+3}) + \ldots + R_{t+1}R_{t+2}\cdots R_{t+TL-1}(1+R_{t+TL}))$$

Where F_j = Output Flow
F_i = Input Flow
R_t = Continuation Rate for Year t
C_{ij} = Capacity of Arc ij
TL = Tour Length Associated with Arc in question

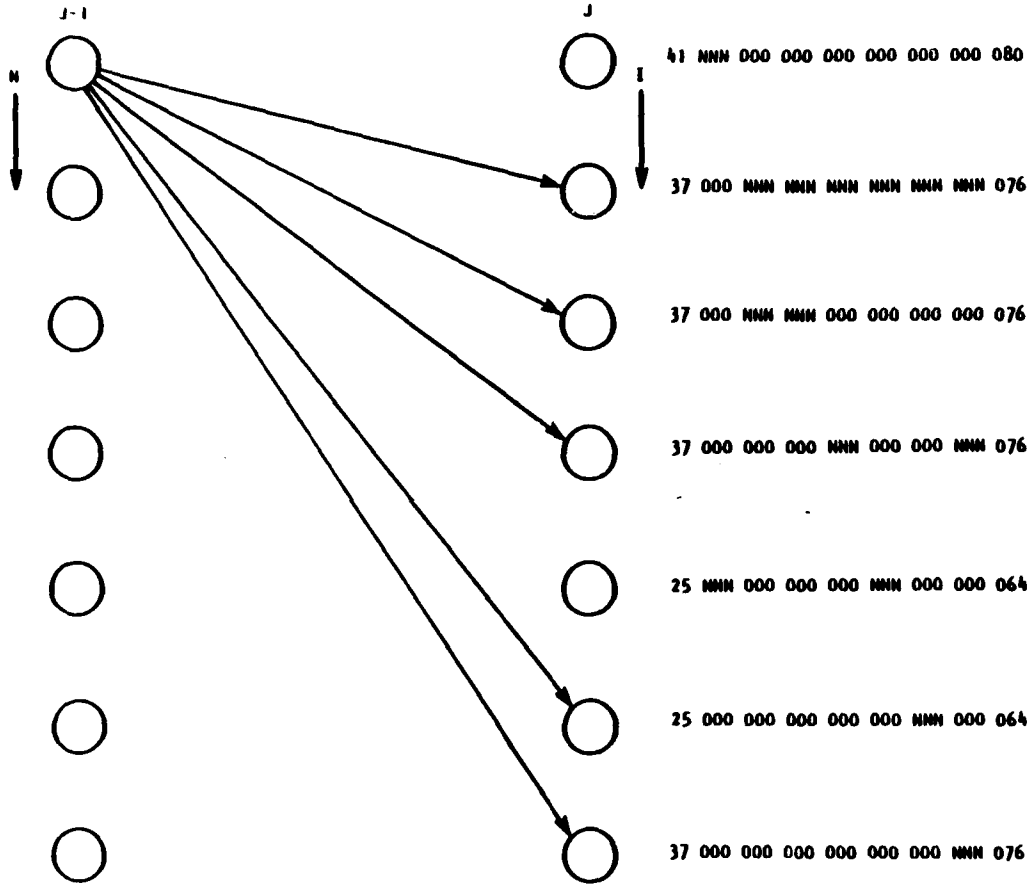


FIGURE 4
TOUR ITERATION METHODOLOGY

a source node from which no flow is permitted. The final entry associated with each node is the total elapsed time in months to node I,J.

The problem which the model must solve involves taking a flow out of node N,J-1, and allocating it to node I,J of the current tour. This is accomplished in a straight forward manner as follows:

For each source node (N,J-1):

1. Flow is allocated to permissible destination nodes in proportion to the unfilled requirement. Destinations for which N,J-1 is a barred source receive zero allocation.

2. Beginning with activity 1 (Fleet Squadrons), allocated flow, tour length, and continuation rates are used to compute the number of Aviation Officers on arc (N,J-1), (I,J).

3. Unfilled requirements for activity 1 are reduced by the value computed in (2) above. If that value is greater than the remaining unfilled requirement, a surplus flow is computed and added to the allocation of the next higher numbered permissible destination activity.

4. The preceeding process is repeated in turn for each destination activity. Capacities are computed, unfilled requirements are reduced, and surplus flows are passed on to succeeding activities.

5. When the last destination node (I=7) is reached, the source node is incremented by 1 and the process is repeated.

The procedure described above is repeated tour by tour through the seven tours contained within the model. It will be

evident that this procedure is an emulation of the officer distribution process, inasmuch as requirements are made to conform to an acceptable distribution pattern, and, in addition, the algorithm adopted for allocating flows to activities establishes an implicit priority-of-fill discipline which is similar to that imposed on the actual distribution process.

G. Computer Program

The general methodology described above was implemented on a WANG 2200 VS Computer using the Wang VS Basic Language. VS Basic is a compiler based version of Basic with a number of advanced features that make it particularly useful for developing complex interactive programs. One objective in developing the Aviation Officer Requirements model was to create a "user friendly" program which would allow manpower planners direct access via interactive work stations. VS Basic facilitates the creation of such programs by providing a number of statements which allow sophisticated screen formatting and program control at the work station. These features are particularly useful when creating menu driven routines which lead the computer naive user through the process of defining the parameters and controlling model execution for a specific scenario.

As was indicated earlier, one important consideration in model development was the desire to provide the user with the ability to specify as many of the significant variables affecting officer requirements as possible. The model as implemented categorizes some 28 variables into five functional groups and allows the user to alter any or all of them.

The functional groups and included variables are as follows:

1. Basic Data
   a. Number of Squadrons
   b. Aircraft per Squadron
   c. Crew Factor (Crews per aircraft)
   d. Number per Crew
   e. Squadron Grade Distribution
   f. Retention

2. Training Requirements
   a. Readiness Squadron Grade Distribution
   b. Undergraduate Training Grade Distribution
   c. Undergraduate Training Instructor Planning Factor

3. Policy Variables
   a. Plowback Instructor Fraction
   b. Postgraduate Flow Fraction
   c. War College Fraction

4. Allocation Parameters
   a. Fraction of Aviation Officers
   b. Fraction of Pilot or NFO
   c. Fraction of Carrier Based
   d. Fraction of Community Type (Jet, Prop, Helo)

5. Network Parameters (For Any Node)
   a. Tour Length
   b. Precedent Node Status

The flexibility afforded the planner in using the model should be apparent from the above listing. In all there are 11 basic variables which can be changed (grade distribution involves three variables and retention involves four). In addition, training requirements cover eight variables; there are three policy variables and four allocation parameters. The network parameters include tour length and 7 precedent nodes for each of the 49 terminal nodes in the career path network. As a practical matter it can be expected that the user of the model will change only a small fraction of the variables on a given run. In fact, most model runs will probably focus on a few key variables influencing force level (Number of Squadrons, Number of Air-

craft), Officer Inventory (Retention), or Officer Distribution (Crew Factor, Tour Length).

In addition to the broad range of input variables afforded, the model has the capacity to produce a broad range of output variables. For each subcommunity, the model records the distribution of officers by tour and activity and also by years of aviation service and activity. This information enables derivation of the number of consequences of a particular requirements solution. For example, since the number of Commanders in fleet squadrons is specified and the command tour start time is established, it is easy to derive the implied fleet squadron command opportunity for a given community. This value is simply the ratio of the number of people entering the command tour to the number of people in the inventory year group in which command tour entry occurs. Similar calculations can be made for Fleet squadron Department Head opportunity.

Since the model segregates operational flying billets from non-flying billets, it is also possible to estimate the degree of achievement of Aviation Career Incentive Pay (ACIP) gates. ACIP gates are defined by law and require that Aviation Officers achieve certain minimum levels of operational flying at 11 and 18 years of Aviation Service in order to be eligible for career incentive pay. These gates are:

Gate 1: Six years of operational flying by 11 years of service.

Gate 2: Eleven years of operational flying by 18 years of service.

Gate 3: Nine years of operational flying by 18 years of service (applies to those failing Gate 2 and carries more stringent eligibility requirements).

Since the Aviation Officer Requirements model produces a year by year inventory display for each activity, the fraction of the ACIP requirement which is met for each gate can be computed. As this is done in the model, the result indicates whether all personnel can be flowed through operational flying billets in time to meet the specified gates. In general, if the ACIP fraction for a given gate is greater than 1, it is possible for all personnel to meet that gate requirement. Conversely, if the fraction is less than 1 some portion of the population will fail to meet the gate requirement.

In addition to the specialized outputs described above, provision is made for listings of projected community total officer population by grade and activity. Accessions to the designator (Pilot Training Rate or NFO Training Rate) required to support the proposed subcommunity population are also given in addition to required accessions to training for supporting the postulated training rates. Figure 5 is the principal output table from the model for a given community run. It contains all of the basic descriptive data for the subcommunity being analyzed and the output variables described above. Figure 6 is an example of the detailed inventory profile produced as part of the output. As can be seen, it displays the projected number of officers in each activity by year of aviation service. Its principal utility is in providing an overview of the deployment of the resulting

LIGHT ATTACK COMMUNITY

SUMMARY DATA

NAVAL AVIATORS

06/09/82
12:19

RETENTION	45 %	NUMBER OF SQUADRONS	24
		AIRCRAFT PER SQUADRON	12
ROLLBACK FRACTION	5 %	CREW FACTOR	1.42
		NAVAL AVIATORS PER CREW	1.00

COMMUNITY POPULATION

ACCESSIONS TO TRAINING (131X)	144	SENIOR COMMANDERS	45		
		COMMANDERS	89	COMMAND OPPORTUNITY	.77
ACCESSIONS TO 131X DESIGNATOR	116	LT. COMMANDERS	215	DEPT HEAD OPPORTUNITY	1.16
FIRST TOUR LENGTH	36	LIEUTENANTS	852		
		TOTALS	1191		

DISTRIBUTION BY GRADE AND ACTIVITY

ACTIVITY	GRADE LT	LCDR	CDR	SEN CDR	TOTAL
FLEET TOURS	393	97	58	4	552
FLEET READINESS SQUADRON	107	6	0	2	115
TRAINING COMMAND	108	14	0	0	122
R3D COMMUNITY	36	2	3	0	41
AFLOAT ASSIGNMENTS	42	8	8	3	61
PROFESSIONAL EDUCATION	40	7	0	0	47
OTHER	116	54	14	30	212
NON-AVIATION ASSIGNMENTS	13	19	0	4	36

ACIP PROJECTIONS	
GATE 1	1.41
GATE 2	1.18
GATE 3	1.46
NON AVIATION	3 %

ALL REQUIREMENTS MET

ITERATIONS = 27 1

FIGURE 5
Model Output for a Community Run

NAVAL AVIATORS

LIGHT ATTACK COMMUNITY

INVENTORY DISPLAY 06/09/82 12:19

YEARS OF AVIATION SERVICE

ACTIVITY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	22	24	24
FLEET TOURS	113	108	112	6	5	4	4	3	12	29	40	36	20	1	12	22	1	0	0	0
FLEET READINESS SQUADRON	0	0	0	30	30	25	22	0	0	0	6	0	0	0	0	0	1	0	0	0
TRAINING COMMAND	6	6	1	32	32	26	2	0	0	3	5	8	1	0	0	0	0	0	0	0
RSD COMMUNITY	0	0	0	7	7	6	2	5	5	4	1	1	0	0	1	1	0	0	0	0
AFLOAT ASSIGNMENTS	0	0	0	0	0	8	14	12	6	2	1	7	0	0	4	0	1	0	0	0
PROFESSIONAL EDUCATION	0	0	0	14	14	2	2	4	3	1	0	0	3	4	0	0	0	0	0	0
OTHER	0	0	0	22	21	21	9	17	14	10	0	0	11	22	12	2	9	2	1	0
UNASSIGNED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NON-AVIATION ASSIGNMENTS	0	0	0	0	0	0	7	6	0	0	0	1	2	7	0	0	2	0	0	0

Figure 6

Detailed Inventory Profile

Aviation Officer inventory. It should be stressed however that, due to rounding within cells, comparisons between activities in later years of aviation service may be misleading since very low flows are involved and rounding error becomes a significant part of the total flow. The model can easily be modified to provide more precise results for those years if required.

The preceding discussion was only intended to give an overview of the computer program developed in connection with the Aviation Officer Requirements Study. A detailed description of model operation, including facsimiles of workstation displays and printed outputs, is provided in Appendix A. This Appendix presents a narrative description of model operation keyed to workstation displays and is intended as a user's manual for the model. Appendix B contains a listing of the basic computer program for the model and Appendix C contains tabulations of the default values for all model variables.

III. MODEL APPLICATION

A. Introduction

In order to demonstrate the way in the Aviation Officer Requirements Model will probably be most useful, this section of the report presents a comparative analysis of requirements for pilots and NFOs for a force containing 12 Carrier Air Wings and for one containing 14 Carrier Air Wings. The analysis is obviously pertinent since current planning calls for a thirteenth Air Wing by FY 1984 and a fourteenth by 1987. However, it should be stressed that the example presented below is for illustrative

purposes only. There are a number of reasons why the results shown could differ significantly from current Navy Plans:

1. The fixed requirements entered in the model are derived from a March 1981 run of the Officer Billet file. A substantial portion of the source data is therefore over 1 year old.

2. The additional two Air Wings are assumed to be full CV Air Wings. The Navy may elect to provide reduced capability Air Wings.

3. It is likely that other increments to Aviation Forces, particularly Maritime Patrol and LAMPS MK III, are also being considered.

For these reasons, the results tabulated below should be viewed as examples of the kinds of results available from the model rather than definitive statements the Navy's current of Aviation Officer Requirements.

B. Baseline Case (12 Carrier Air Wings)

In developing the application example, the model was first run to obtain a base case statement of requirements for currently authorized force levels. These are the force levels shown in Table III. The model was run for all 23 subcommunities (14 Naval Aviator and 9 Naval Flight Officer), with model parameters set at default values except for the following:

1. Retention

Jet Aviators (Less Force Support)	40%
Prop. Aviators (Less Force Support)	45%
Helicopter Aviators (Less Force Support)	50%
Force Support Aviators	35%

	All Naval Flight Officers	50%
2.	Plowback Fraction	
	Jet and Prop Aviators	5%
	Helo Aviators and NFOs	0%
3.	Fleet Tour Lengths	
	Tour 3, Tour 4, Tour 5 (vice 36 month Default Value)	30 Mos.

The above changes bring the model closer to current retention experience and detailing practice.

The set of baseline results obtained by running the model for all subcommunities under the conditions described above are summarized in Tables 4 through 7. It will be noted that these summaries contain two sets of estimates for each subcommunity: one labelled LOW and a second labelled TOTAL. As described earlier, when testing results at the end of each iteration, the model first examines the degree to which requirements for the first six activities (all except OTHER) have been met. If these requirements have been met, an output display is generated and a complete output print can be made prior to continuing the solution. The model then proceeds to generate inventory to fill the remaining OTHER requirement and completes the solution for the subcommunity.[4/] There are thus two solutions available for

4/ Two procedural features of the Aviation Officer Requirements model should be stressed:

a. Because of the structure of the Allocation Matrix and the sequencing of activities, the model tends to place the lowest priority on OTHER requirements. Therefore it is quite likely that the first six activities will be filled before OTHER.

b. Despite internal priorities, the model does fill other requirements as resources permit. Therefore when the first requirements test is satisfied, some portion of the OTHER requirement will also be filled.

each subcommunity: one which assures that all requirements except OTHER are met, and a final solution which assures that the total requirement is met. The two solutions (LOW and TOTAL) provide a range in which the planner can be confident that immediate requirements will be met, and, depending on the magnitude of the unmet OTHER requirements, may provide a base for subsequent tradeoff analysis of requirements at the margin. (It may be appropriate to consider redefining OTHER requirements to other designators rather than generate additional inventory.)

Table IV-A presents the baseline results for Naval Aviators while Table IV-B presents similar results for Naval Flight Officers. These tables have been structured to show subcommunity groupings arranged by Undergraduate Training pipline so that comparison with existing training rates is facilitated.

Referring to Table IV-A, the baseline case estimates a LOW inventory of 10,595 Naval Aviators and a TOTAL inventory of 11,394. The LOW inventory estimate results in a total of 280 OTHER billets going unfilled. Conversely, under the LOW estimate, the model was forced to assign a total of 557 Aviators to Non-Aviation Tours; under the TOTAL estimate, the Non-Aviation total was 913. Thus in filling the 280 OTHER billets, the model created an additional 267 Non-Aviation assignments.

Table IV-B shows a total inventory requirement of 4,784 Naval Flight Officers under the LOW estimate and 4,811 under the TOTAL estimate. Unlike the case for Naval Aviators, the NFO inventory requirement is generally met completely by the LOW estimate.

TABLE IV-A

Baseline Requirements - Naval Aviators

Subcommunity	LOW*		TOTAL	
	Inventory	Training Rate	Inventory	Training Rate
Light Attack (VA)	1153	118	1222	125
Fighter (VF)	981	100	1064	108
Medium Attack (VAM)	473	48	542	55
Electronic Warfare (VAQ)	247	25	247	25
Carrier ASW (VS)	510	52	573	58
FORCE SUPPORT JET	832	89	913	98
TOTAL JET	4196	432	4561	469

* Unmet OTHER Requirements = 124

Maritime Patrol (VP)	2234	219	2315	226
Early Warning (VAW)	335	34	345	35
Electronic Warfare (VQ)	370	36	370	36
FORCE SUPPORT PROP	342	36	527	56
TOTAL PROP	3281	325	3557	353

* Unmet OTHER Requirements = 103

Helicopter ASW (HS)	591	55	628	59
LAMPS MK I (HSL)	667	63	742	70
LAMPS MKIII (HSL)	1102	104	1148	108
FORCE SUPPORT HELO	758	81	758	81
TOTAL HELO	3118	303	3276	318

* Unmet OTHER Requirements = 53

TABLE IV-B

Baseline Requirements - Naval Flight Officers

Subcommunity	LOW*		TOTAL	
	Inventory	Training Rate	Inventory	Training Rate
Fighter (VF)	813	76	813	76
TOTAL JET	813	76	813	76
* Unmet OTHER Requirement = 0				
Medium Attack (VAM)	452	42	461	43
Electronic Warfare (VAQ)	485	46	485	46
Carrier ASW (VS)	498	47	498	47
FORCE SUPPORT JET	143	13	143	13
TN TOTAL	1578	148	1587	149
* Unmet OTHER Requirements = 2				
Early Warning (VAW)	417	39	430	40
ATDS TOTAL	417	39	430	40
* Unmet OTHER Requirements = 4				
Maritime Patrol (VP)	1482	139	1482	139
Electronic Warfare (VQ)	420	39	420	39
FORCE SUPPORT PROP	74	7	79	7
NAV TOTAL	1976	185	1981	185
* Unmet OTHER Requirements = 1				

This is due to the grade structure of the NFO requirement. The Lieutenant requirement and, in particular the Fleet and Training requirements, are a much more dominant part of the total requirement for NFOs than for pilots. As a result, once the Lieutenant requirement is met, enough senior officers have been generated to meet all requirements. In fact the NFO community as a whole ends up with 772 assignments to Non-Aviation billets; almost as many as were generated for Naval Aviators at twice the inventory level.

C. Expanded Requirements Case (14 Air Wings)

One of the primary objectives in developing the Aviation Officer Requirements model was to provide a capability for rapidly assessing the impact of force level changes on officer requirements. Currently, the number of Carrier Air Wings is programmed to increase to 14 by 1987. The model was exercised to determine the impact of this increase by generating new runs for the affected subcommunities. Specifically:

1. VA and VF Squadrons were increased by four. All remaining carrier based subcommunities were increased by two squadrons (VAM, VAW, VAQ, VS, HS).

2. Readiness Squadron Lieutenants were increased in proportion to the squadron increase to provide required flight instructors.

All other parameters of the baseline runs remained unchanged. The results of these runs were shown in Tables V-A and V-B.

Table V-A shows the results of the expanded requirements runs for Naval Aviators. Under this requirement the LOW estimate has risen to 11,153 Aviators, an increase of 558 Aviators, while the TOTAL estimate has risen to 11,757, an increase of only 363 Aviators. In addition, the unmet OTHER requirements under the LOW estimate have decreased from 280 to 212. At the same time, the model generates 596 Non-Aviation assignments under the LOW estimate and 824 under the TOTAL estimate.

The increase in direct fleet billets represented in Table V-A is 248. It is somewhat surprising that this results in total inventory increases of 558 at the LOW estimate and 363 for the TOTAL estimate. What has happended is that Non-Aviation tours have been reduced, indicating that a better match is occurring between requirements and projected inventory at the higher force levels. The logic of this becomes evident when considering that the addition of an increment consisting predominantly of Lieutenants provides a better match to the current number of commander billets in the shore establishment. The model is then less likely to generate surpluses which have to flow to Non-Aviation assignments.

Table V-B shows the results of the expanded requirements runs for Naval Flight Officers. As with the previous NFO runs, there is virtually no difference between the LOW and TOTAL estimates, indicating that OTHER requirements are substantially met in the process of filling requirements for the first six activities. Under the expanded requirements, NFO requirements increase from

TABLE V-A

Expanded Requirements (14 Air Wings)
Naval Aviators

Subcommunity	LOW*		TOTAL	
	Inventory	Training Rate	Inventory	Training Rate
Light Attack (VA)	1239	127	1281	131
Fighter (VF)	1151	118	1151	118
Medium Attack (VAM)	544	56	574	59
Electronic Warfare (VAQ)	297	30	297	30
Carrier ASW (VS)	589	60	614	63
FORCE SUPPORT JET	832	89	913	98
TOTAL JET	4652	480	4830	499

* Unmet OTHER Requirements = 63

Maritime Patrol (VP)	2234	219	2315	226
Early Warning (VAW)	365	37	379	39
Electronic Warfare (VQ)	370	36	370	36
FORCE SUPPORT PROP	342	36	527	36
TOTAL PROP	3311	328	3591	357

* Unmet OTHER Requirements = 104

Helicopter ASW (HS)	663	62	668	65
LAMPS MK I (HSL)	667	63	742	70
LAMPS MK III (HSL)	1102	104	1148	108
FORCE SUPPORT HELO	758	81	758	81
TOTAL HELO	3190	311	3336	324

* Unmet OTHER Requirements = 45

TABLE V-B

Expanded Requirements (14 Air Wings)
Naval Flight Officers

Subcommunity	LOW*		TOTAL	
	Inventory	Training Rate	Inventory	Training Rate
Fighter (VF)	935	88	935	88
RIO TOTAL	935	88	935	88
Medium Attack (VAM)	524	49	524	49
Electronic Warfare (VAQ)	564	53	564	53
Carrier ASW (VS)	583	55	583	55
FORCE SUPPORT JET	143	13	143	13
TN TOTAL	1814	170	1814	170
Early Warning (VAW)	481	45	481	45
ATDS TOTAL	481	45	481	45
Maritime Patrol (VP)	1482	139	1482	139
Electronic Warfare (VQ)	420	39	420	39
FORCE SUPPORT PROP	74	7	79	7
NAV TOTAL	1976	185	1981	185

* Unmet OTHER Requirement = 1 (NAV)

4,811 to 5,211. Thus, to meet an increase of 192 in direct requirements, the total requirement grows by 400. In addition, the Non-Aviation requirement grows by 118 indicating that the dominant influence in increasing the total requirement is the increase in the number of Lieutenants. Recall that Lieutenants were already the controlling factor defining NFO inventory. Therefore, as more are generated in response to increased demand, the resulting senior officers added to the steady state inventory must be assigned out of Aviation.

D. Training Rates

It is of some interest to compare the training rates derived above to the currently programmed training rates. Table VI summarizes Pilot and Naval Flight Officer Training Rates by training pipeline from Tables IV and V and compares them with the planning figures proposed for FY 1984.

Table VI

Comparison Of Training Rates
As Developed In Model With Navy Program

	MODEL		NAVY
PILOT TRAINING RATES	Baseline (12 Air Wings)	Expanded (14 Air Wings)	FY 84
Strike (JET)	469	499	394
Maritime (PROP)	353	357	373
Helicopter	318	324	320
TOTAL	1,130	1,180	1,087
NFO TRAINING RATES			
Radar Intercept Off. (RIO)	76	88	81
Tatical Navigator (TN)	149	170	184
Automatic Tactical Data System (ATDS)	40	45	60
Navigator (NAV)	185	185	220
TOTAL	450	488	545

Comparison of pilot training rates reveals significant differences between model-predicted requirements and the Navy Program for Jet training. Prop and Helicopter requirements are very close. The lower Jet training rate in the Navy Program reflects the current jet training aircraft constraints which are projected to persist for the remainder of the decade. Given such a long term shortfall, it can be expected that the number of OTHER billets fillable by Jet Aviators will have to decline to offset a widening gap between inventory and requirements.

Comparison of NFO Training Rates as developed by the model reveals that model results are significantly below programmed rates, particularly for the ATDS and NAVIGATOR pipelines. There are persuasive reasons for this difference which are discussed below, but it should be recognized that production rates as high as those programmed will greatly increase the requirement to flow senior Naval Flight Officers into Out-of-Aviation Billets.

E. Tour Length and Command Opportunity

As part of the output for each subcommunity run, the model provides estimates of the tour length which will be required of first tour Aviators and of fleet squadron department head and command opportunity. Tables VII-A and -B present these results for the baseline and expanded requirements runs described above.

Examination of these two tables reveals that there is a significant difference in average first tour length between Naval Aviators and NFOs, with the respective values averaging 40 and 50

TABLE VII-A

First Tour Length, & Fleet Tour Opportunities
Naval Aviators

	BASELINE (12 AIR WINGS)			EXPANDED REQUIREMENTS (14 AIR WINGS)		
Community	First Tour Length	Command Oppor-tunity	Depart. Head Oppor.	First Tour Length	Command Oppor-tunity	Depart. Head Oppor.
Light Attack (VAL)	34	.78	1.38	38	.87	1.54
Fighter (VF)	38	.45	.85	39	.48	.89
Medium Attack (VAM)	41	.44	.88	44	.48	.94
Electronic Warfare (VAQ)	29	.87	1.38	20	.86	1.33
Carrier ASW (VS)	42	.38	.97	46	.42	1.06
FORCE SUPPORT JET	38	.56	1.63	—	—	—
Maritime Patrol (VP)	48	.20	.79	—	—	—
Early Warning (VAW)	37	.69	1.23	39	.74	1.28
Electronic Warfare (VQ)	46	.21	.77	—	—	—
FORCE SUPPORT PROP	15	.08	.40	—	—	—
Helicopter ASW (HS)	39	.70	1.28	43	.74	1.34
LAMPS MK I (HSL)	47	.30	.56	—	—	—
LAMPS MK III (HSL)	44	.25	1.63	—	—	—
FORCE SUPPORT HELO	48	.45	1.13	—	—	—

TABLE VII-B

First Tour Length, & Fleet Tour Opportunities
Naval Flight Officers

	BASELINE (12 AIR WINGS)			EXPANDED REQUIREMENTS (14 AIR WINGS)		
Community	First Tour Length	Command Oppor-tunity	Depart. Head Oppor.	First Tour Length	Command Oppor-tunity	Depart. Head Oppor.
Fighter (VF)	50	.55	.89	51	.56	.89
Medium Attack (VAM)	51	.48	.78	52	.50	.80
Electronic Warfare (VAQ)	48	.38	.91	49	.40	.94
Carrier ASW (VS)	51	.41	.92	51	.42	.95
FORCE SUPPORT JET	49	.78	97	—	—	—
Early Warning (VAW)	51	.52	.84	52	.54	.87
Maritime Patrol (VP)	51	.30	.85	—	—	—
Electronic Warfare (VQ)	50	.13	.39	—	—	—
FORCE SUPPORT PROP	45	.47	.68	—	—	—

months. The longer NFO first tour is the product of the relative emphasis on junior billets in the NFO requirements. The model is able to satisfy senior requirements for NFOs with relatively few junior officers. The lower number of junior NFOs must serve longer in the first tour to meet requirements. This explains why the programmed training rates for NFOs are significantly higher than those given by the model. Those higher rates tend to equalize Pilot and NFO first tours. However, it must be recognized that in taking this course, large numbers of surplus senior officers are being generated.

The intent of this section of the report was to demonstrate, through a reasonably complicated planning problem, the application of the Aviation Officer Requirements model. It was desired to show a representative range of variables manipulated as they might be in a real programming analysis. The total effort required 35 separate community runs and just under 3 hours of computer connect time. Clearly, the results suggest other runs to examine the influence of other variables. For example, given the difference in response observed between Pilots and NFOs with respect to first tour length, it would be of some use to examine the influence of retention, later tour length, or variations in permissible career paths on the observed results. These and other alternatives available illustrate the range of the model as a planning tool. They also suggest that a large number of feasible solutions to the Aviation Officer requirements problem can be developed from the model.

Users who expect decisions from the model will be disappointed since it is designed only as a tool to assist planners who understand Aviation Officer requirements. It can be used to rapidly quantify alternatives or to assist in illuminating personnel management issues, but it cannot make decisions; that is the province of the planner.

IV. FUTURE DEVELOPMENT

As with any complex computer based model, the process of testing and use has revealed a number of ways in which the model can be improved and enhanced. These are identified and discussed below.

Optimization. The discussion in the previous section clearly indicates that the solutions provided by model were simply feasible solutions for each individual subcommunity. Differences between subcommunities suggest that there are probably more efficient solutions involving reallocation of non-community specific requirements across subcommunities. For example, the structural differences noted between Pilots and NFOs could be addressed by allocating more of the OTHER requirement at senior grade levels to NFOs. This would simultaneously tend to increase the number of junior NFOs and decrease the number of junior aviators.

In more general terms, the main improvement suggested for the Aviation Officer Requirements model is to provide a capability for optimization. To accomplish this the model must first be modified to permit a single run covering all subcommunities.

This global run capability must permit pre-specification of all variables and cross assignment of officers between subcommunities.

There are a variety of ways in which optimization may be defined. For example, the acquisition (recruiting and training) cost of a given inventory of officers could be minimized. Alternatively, the annual cost of holding that inventory could be minimized. Another choice is to minimize the total number of officers in the inventory. (This alternative would not necessarily represent a minimization of acquisition or holding costs.) From the choices available, a definition must be selected. In addition, the independent variables over which optimization is to be computed must be specified from among the model parameters.

Generalization of Results

The ultimate utility of the Aviation Officer Requirements model will depend in some measure on the feasibility of applying the modeling technique to other officer communities. Two features of the model that could cause difficulty in this respect are the division of the requirement into subcommunities and the definition of career activities. The process of creating subcommunities and defining activities for Aviation was largely intuitive. At this point, intuitive divisions in other officer communities are not readily apparent, although those engaged in managing the communities of interest may be able to provide some insights. In any event, to facilitate general application of the modeling technique, research is required to develop a fairly rigorous technique for analyzing an officer community.

Configuration Management

A significant problem exists with respect to the whole assemblage of officer models used in the officer requirements determination and distribution process. This problem is the lack of coherence and consistency among the two dozen or so existing models. Recognizing this situation, OP-01 has taken the initiative of establishing the Naval Officer Modeling System (NOMS). NOMS will establish an architectural framework that will enforce a degree of standardization for models across officer communities, while allowing for necessary variations due to community characteristics. NOMS will also attempt to assure that officer modeling efforts are longitudinally consistent throughout the planning, programming, and distribution processes. The impact of these considerations is that, as NOMS architecture evolves over the next year, some additional research will be required to establish the interface requirements between the NOMS data base and the Aviation Officer Requirements model.

The research required to develop the enhancements described above and to lay the ground work for broad application of the basic modeling technique will be undertaken in the near future as an extension of the effort reported herein.

APPENDIX A

AVIATION OFFICER REQUIREMENTS MODEL

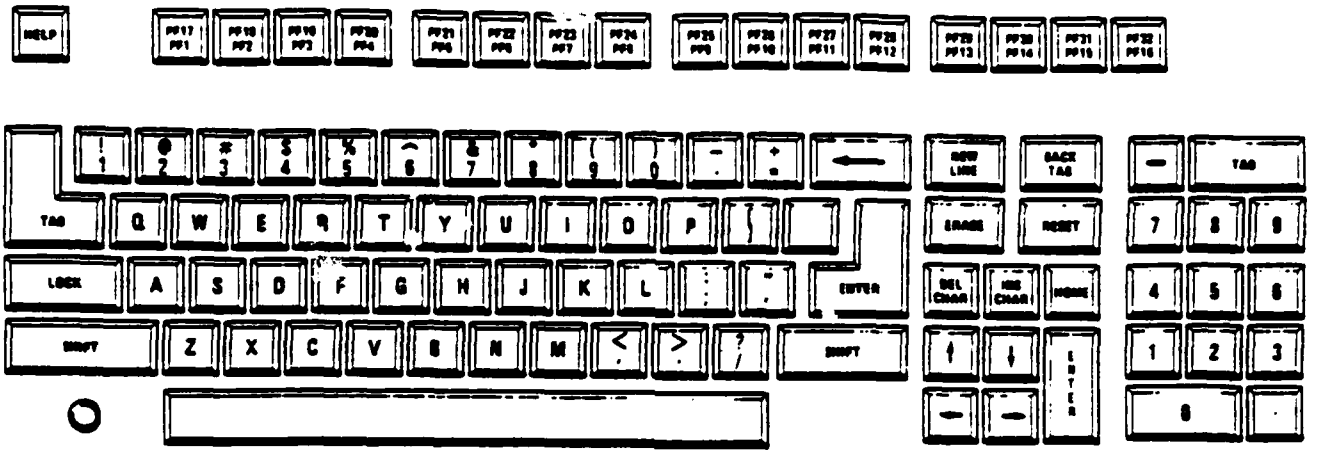
USER'S GUIDE

The objective of this appendix is to provide the user's non-ADP personnel with the information necessary to effectively use the Aviation Officers Requirements Model.

The Aviation Officers Requirements Model provides an automated capability to effectively deal with officer requirements determinations through interactive, user-friendly processing.

The user of the Aviation Officer Requirements Model must know how to initiate and stop computer processing as well as how to use the system to produce useful results. This appendix is presented in such a way as to walk the user through the system from start to finish and provide an example of every screen or option possible. Use of this appendix should make the Aviation Officer Requirements Model easy to operate for all personnel. While the model is designed for personnel with limited computer experience, it is assumed that users are familiar with the Aviation Officer Requirements Determination process.

On the next page of this appendix is a picture of the computer keyboard and a brief explanation of the PF-keys, which are used for the majority of the interactions in the Aviation Officer Requirements Model. An explanation of the cursor control keys is also provided.



THE KEYBOARD

PROGRAM FUNCTION (PF) - The 16 PF keys act the same as the ENTER key, except that each key generates a unique character. A controlling program can therefore examine the character to determine which PF key was struck. The values of the PF keys are affected by SHIFT: the lowercase values are PF 1 - PF 16 and the uppercase values, PF 17 - PF 32.

Non-Field-Sensitive Cursor Positioning Keys

These keys position the cursor without regard for the presence of particular fields. They can be used to position the cursor at any location on the screen. There are four keys in this group; all provide the automatic repeat feature, which causes keystrokes to be entered continually while the key is pressed:

Up arrow - Moves the cursor up one row in the same column. If positioned in the top row, the cursor moves to the bottom row in the same column.

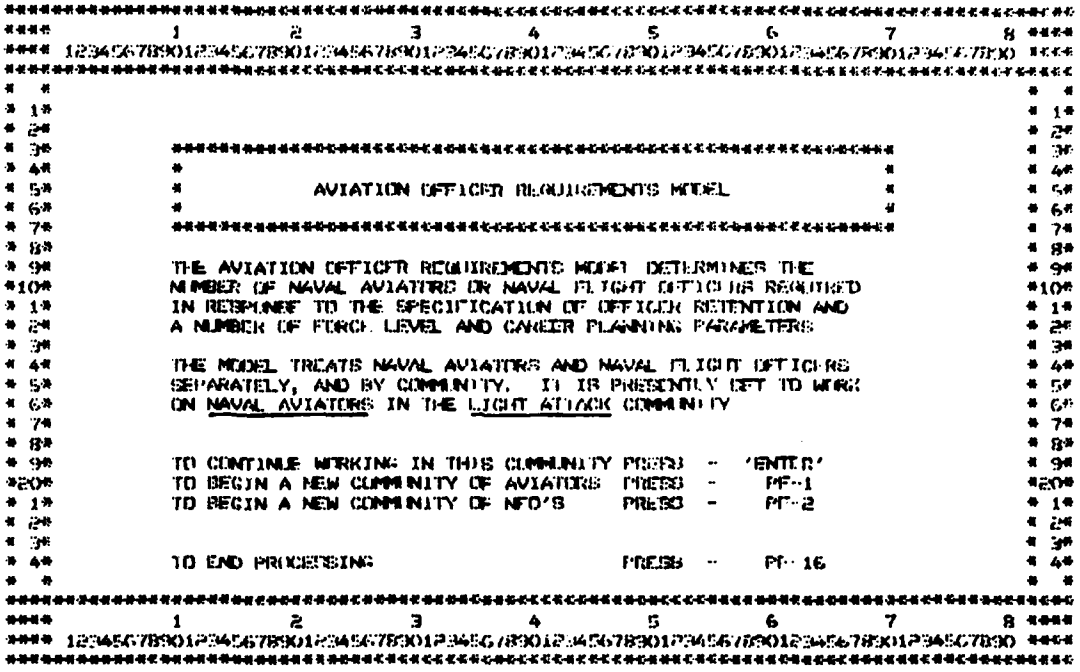
Down arrow - Moves the cursor down one row in the same column. If positioned in the bottom row, the cursor moves to the top row in the same column.

Right arrow - Moves the cursor one location to the right in the same row. If positioned at the end of a row, the cursor moves to the beginning of the next row. If positioned at the end of the bottom row, it moves to the beginning of the top row.

Left arrow - Moves the cursor one location to the left in the same row. If positioned at the beginning of a

row, the cursor moves to the end of the preceding row. If positioned at the beginning of the top row, it moves to the end of the bottom row.

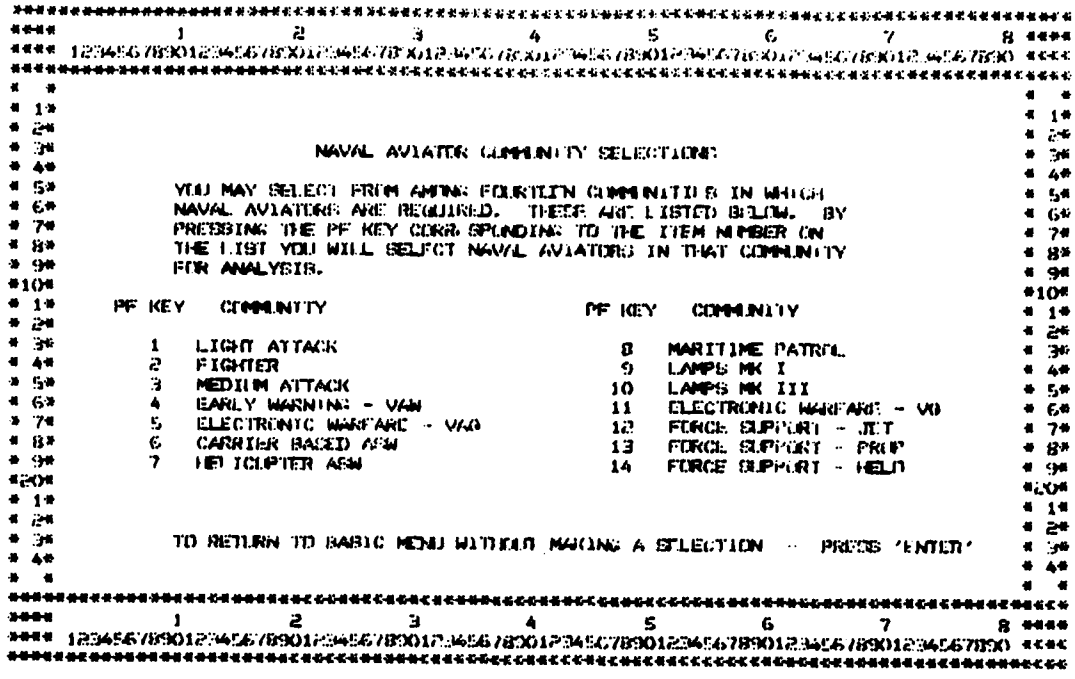
ENTER - The normal means of terminating user entry and requesting the program to process data. SHIFT does not affect the action of ENTER, and ENTER is not honored while the keyboard data entry keys are locked.



COMMUNITY SELECTION MENU SCREEN

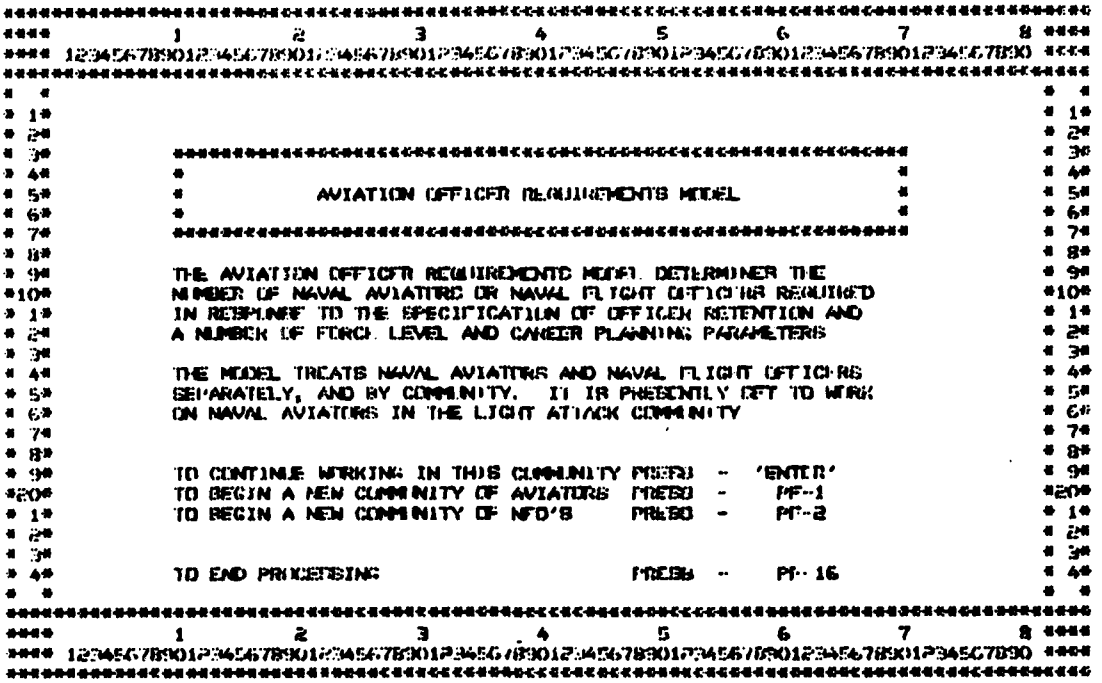
This screen acts as the Control Screen. In order to exit from the Aviation Officer Requirements Model, the user must return to this screen and depress the PF-16 key. This key not only ends the processing but also is the only way to get printed output.

On the computer screen, the words NAVAL AVIATOR and LIGHT ATTACK appear as flashing words; they have been underscored in the screen picture above for purposes of highlighting. These words flash to indicate that they are variable, defining the community in which the user chooses to work. If the user wishes to work on NAVAL AVIATORS in the LIGHT ATTACK community, then all that is required is that the user hit the "ENTER" key. The "ENTER" key in this segment of processing works as the default.



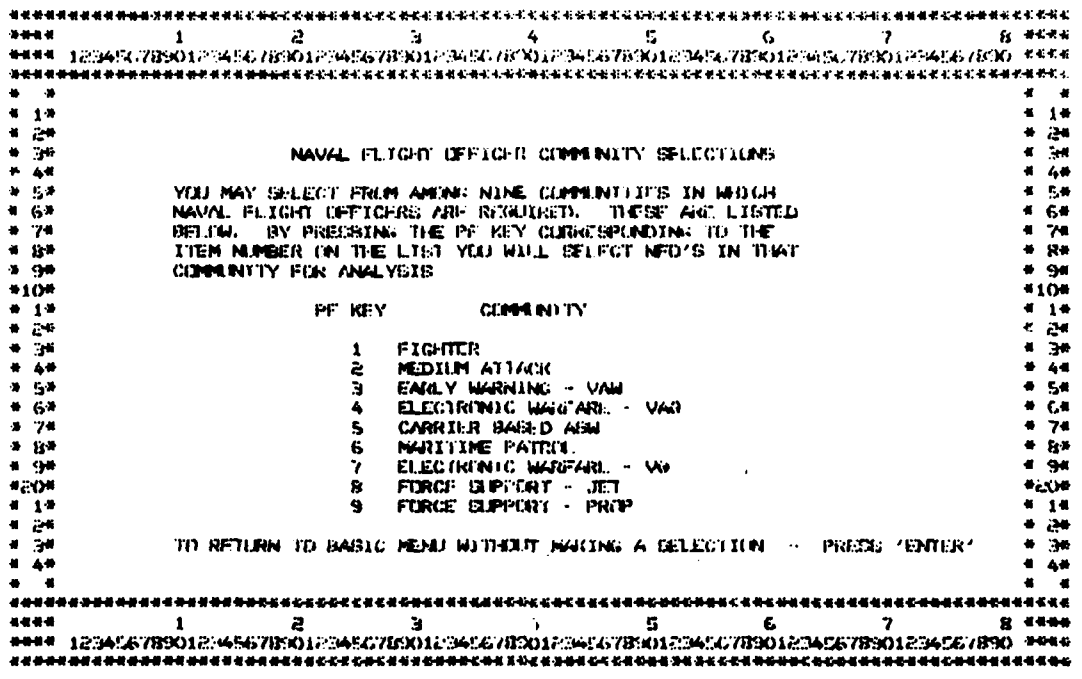
NAVAL AVIATOR COMMUNITY SELECTION MENU SCREEN

Depressing the PF-1 key on the Community Selection screen will produce this screen. Now the user may select any of the 14 communities in which Naval Aviators are required. By depressing the "ENTER" key, the user will return to the Community Selection screen without altering the current community selection. By pressing any of the PF keys, the user will enter a different community, causing the Community Selection screen to change the flashing words indicating community choice. The selected community choice is identified on all subsequent screens.



COMMUNITY SELECTION MENU SCREEN

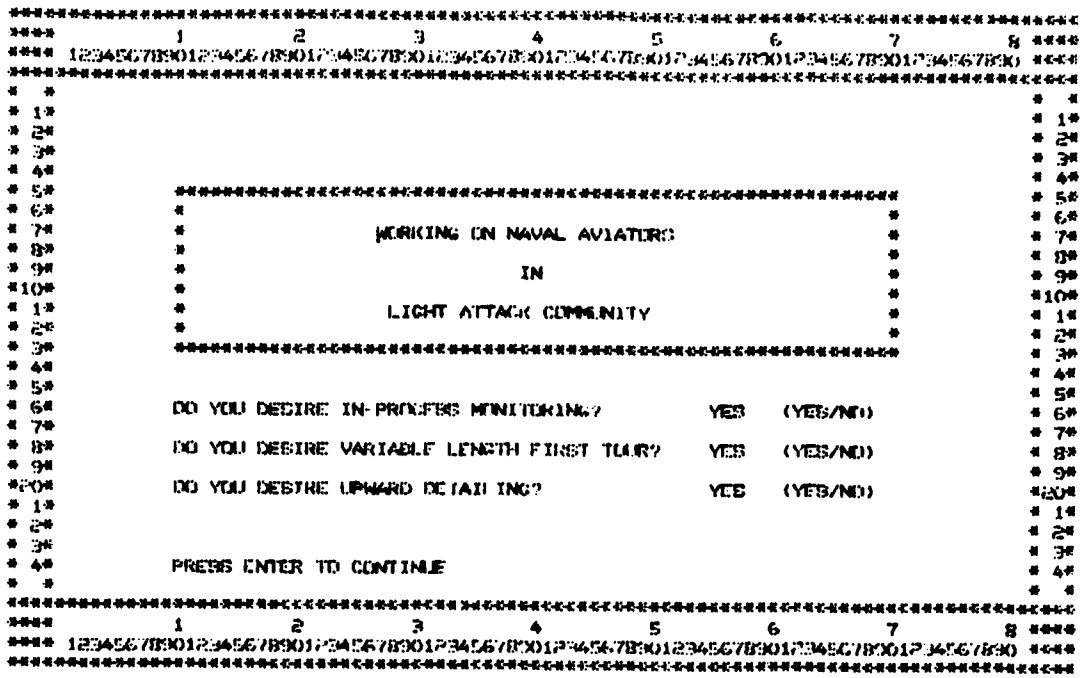
If the user wishes to work in a new community of Naval Flight Officers, he must depress the PF-2 key. After doing this, the screen on the following page of this appendix will appear.



NFO COMMUNITY SELECTION MENU SCREEN

After depressing the PF-2 key in the Community Selection screen, the screen shown above will appear. This screen allows the user the option of choosing to work in one of nine NFO communities. By depressing the "ENTER" key, the user will return to the Community Selection screen without making any changes to the default values.

When returning to the Community Selection screen, the flashing words will now read NAVAL FLIGHT OFFICERS instead of NAVAL AVIATORS, and the name of the selected community.



The screen on this page allows the user to select several more options for his work. One of the possible options available to the user is In-Process Monitoring. In-Process Monitoring lets the user see intermediate results between main iterations. The user can run the system with minimal interaction by entering NO in place of YES next to "DO YOU DESIRE IN-PROCESS MONITORING?"

The line then should look like this:

DO YOU DESIRE IN-PROCESS MONITORING? NO (YES/NO)

It should be noted that this and all subsequent screens present predefined fields in which entries can be made. The cursor is controlled to move only to those fields. This greatly simplifies selection of alternatives or definition of parameters since the user need only make his entry without having to position the cursor. If no change to a particularly parameter is desired, the

tab key may be pressed to move to the proper field for the next parameter which can be altered.

Another possible option is the Variable Length First Tour Option. Variable Length First Tour is the default; however, the user may wish to run the model with a fixed first tour value of 43 months. If so, the user enters NO directly across from "DO YOU DESIRE VARIABLE LENGTH FIRST TOUR?"

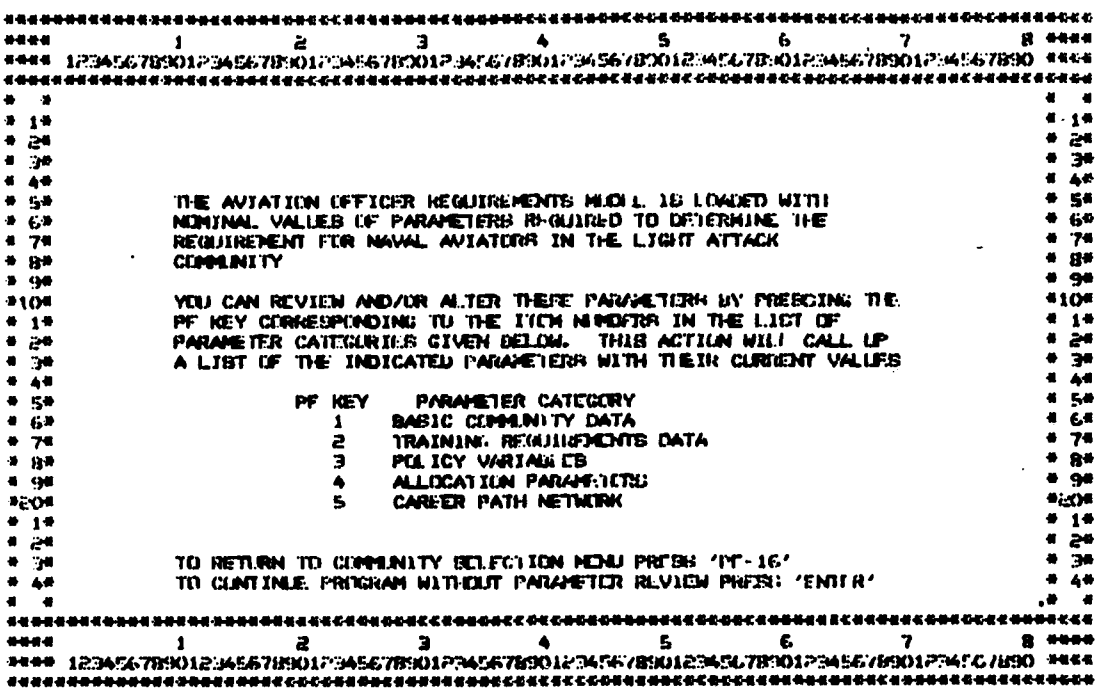
The line then should look like this:

DO YOU DESIRE VARIABLE LENGTH FIRST TOUR? NO (YES/NO)

The last possible option involves upward detailing. This option allows the system to assign officers to requirements of the next higher grade level when all requirements at the current grade level have been met. If the user does not wish to use upward detailing, NO is entered directly across from "DO YOU DESIRE UPWARD DETAILING?"

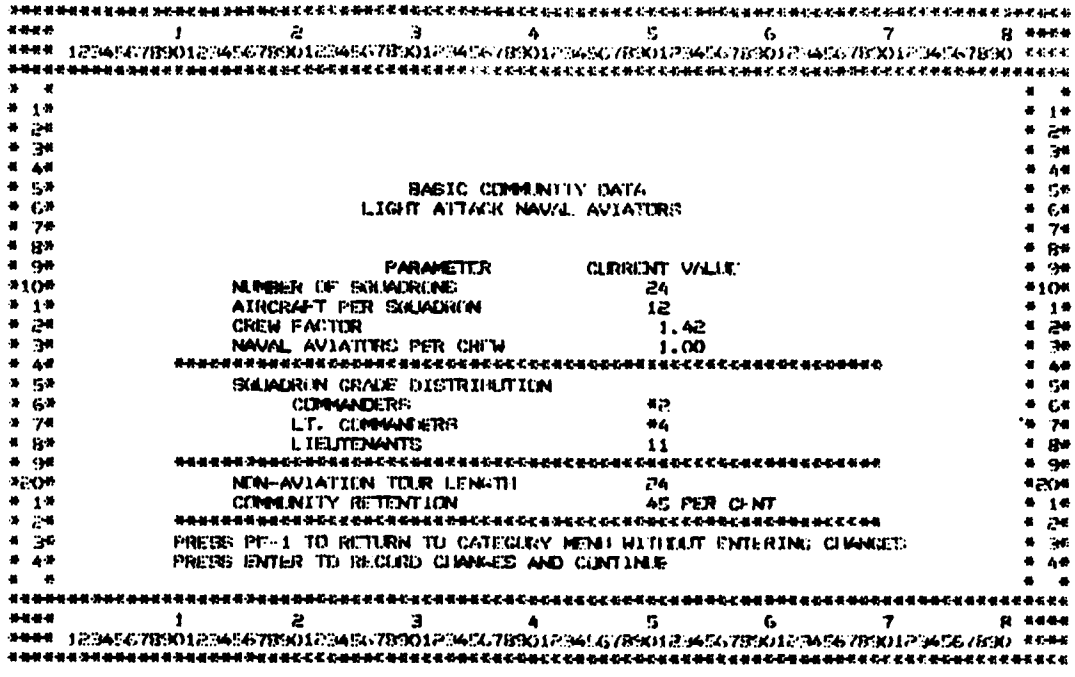
The line then should look like this:

DO YOU DESIRE UPWARD DETAILING? NO (YES/NO)



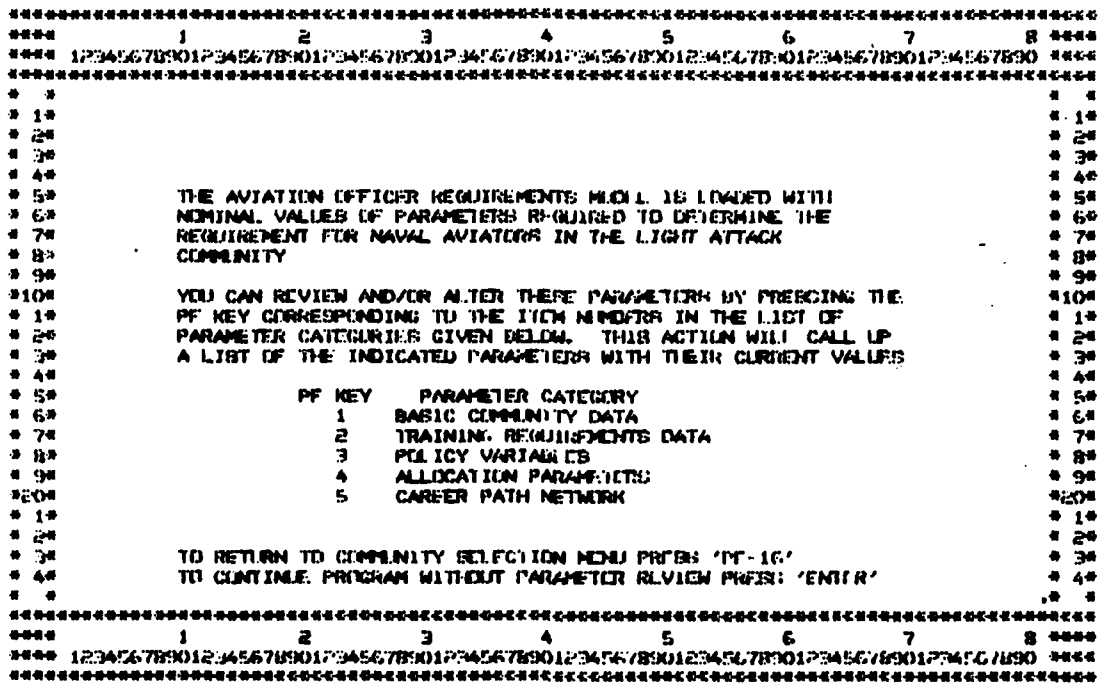
CATEGORY MENU SCREEN

This screen allows the user to enter one of five parameter categories in order to change existing parameters. If the user wishes to change any existing parameters in Basic Community Data, he would depress the PF-1 key. The screen on the next page of this appendix would then appear.



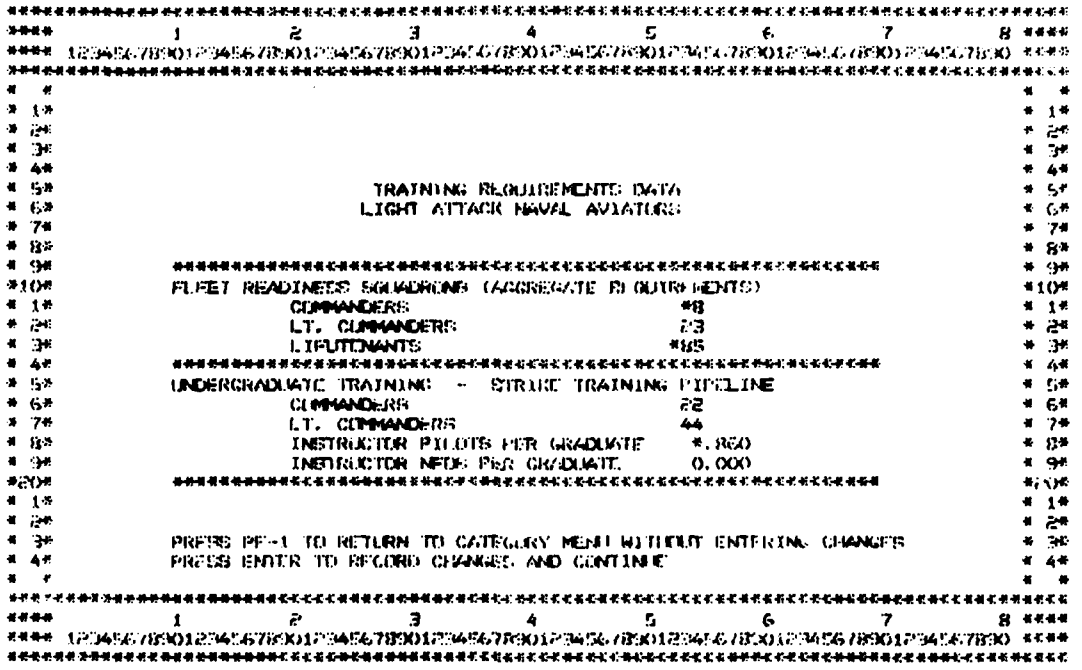
BASIC COMMUNITY DATA CHANGE SCREEN

This screen displays the current value of changeable parameters in Basic Community data. The user may change any or all existing parameters, or he may decide not to change anything. The user should be aware that the Parameters CREW FACTOR and NAVAL AVIATORS PER CREW, if changed, will affect only the number of Lieutenants in the squadron unless the number of Commanders and/or Lieutenant Commanders in Squadron Grade Distribution is changed. In order to record changes, the user must depress the "ENTER" key. When this is done, the system will return to the category menu.



CATEGORY MENU SCREEN

If the user wishes to change existing parameters in Training Requirements Data, he must depress the PF-2 key. Upon selecting Training Requirements Data, the screen on the next page of this appendix will appear.

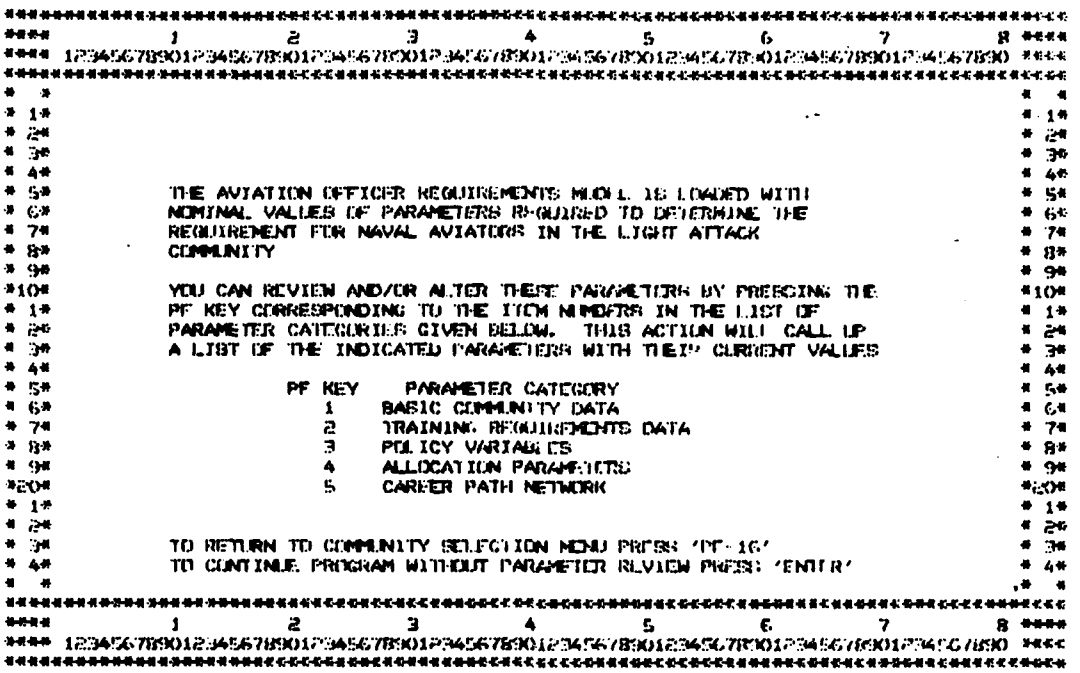


TRAINING REQUIREMENTS DATA CHANGE SCREEN

This screen displays the current value of the Parameters within Training Requirements Data. The user may change any or all existing parameters or he may decide that the existing parameters meet the necessary requirements. The user should be aware that the number of Lieutenants for undergraduate training is determined by the Instructor Planning Factors (Instructor Pilots per Graduates, Instructor NFOs per Graduates).

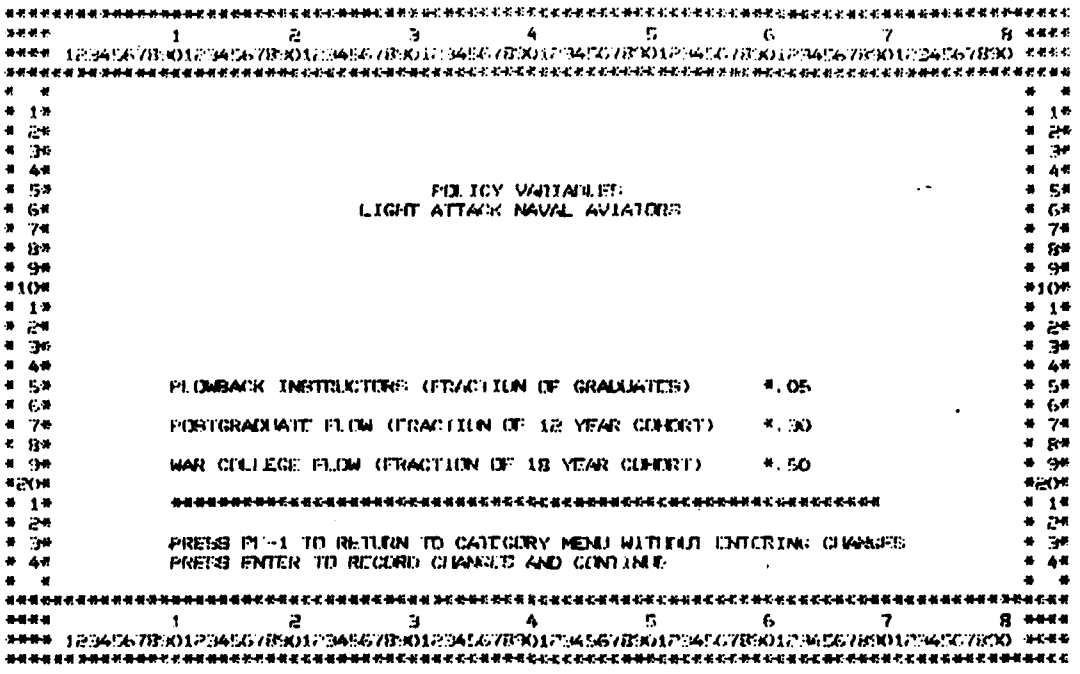
If the user chooses to change the parameters after he has entered his changes, he must depress the "ENTER" key in order to record the changes and continue. The same process is followed if he wishes to default to the current values. However, if the user has second thoughts after entering a change or several changes,

he may cancel out those changes by depressing the PF-1 key; this will return him to the category menu without entering the changes.



CATEGORY SELECTION MENU SCREEN

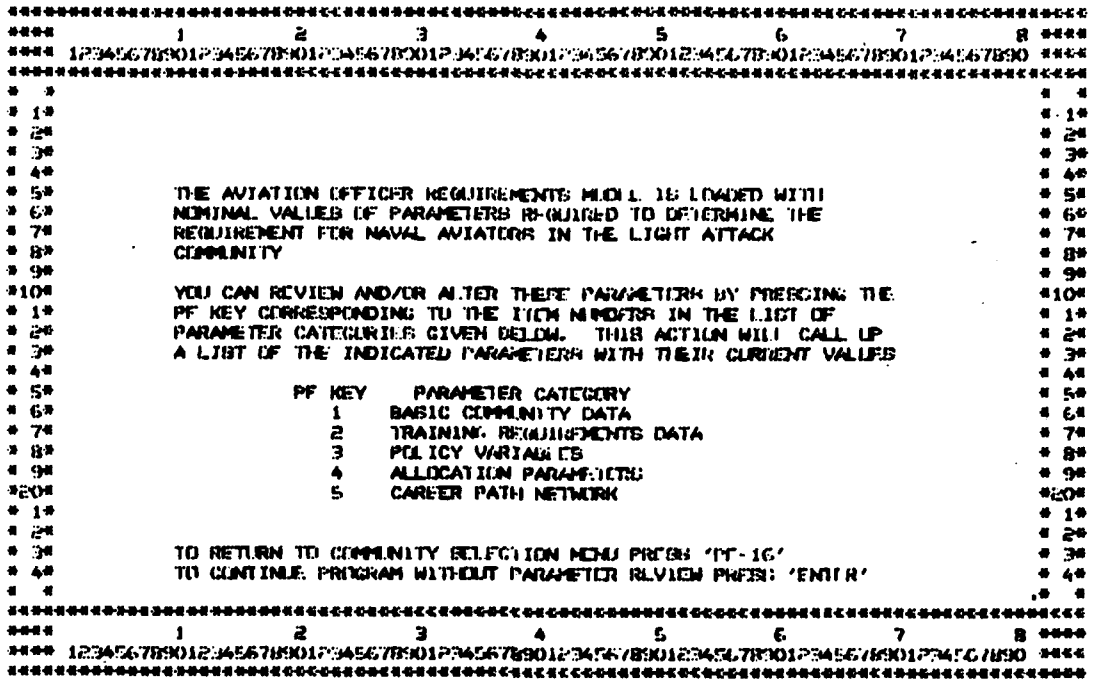
If the user wishes to change existing parameters in Policy Variables, he must depress the PF-3 key. Upon selecting Policy Variables, the screen on the next page of this appendix will appear.



POLICY VARIABLES CHANGE SCREEN

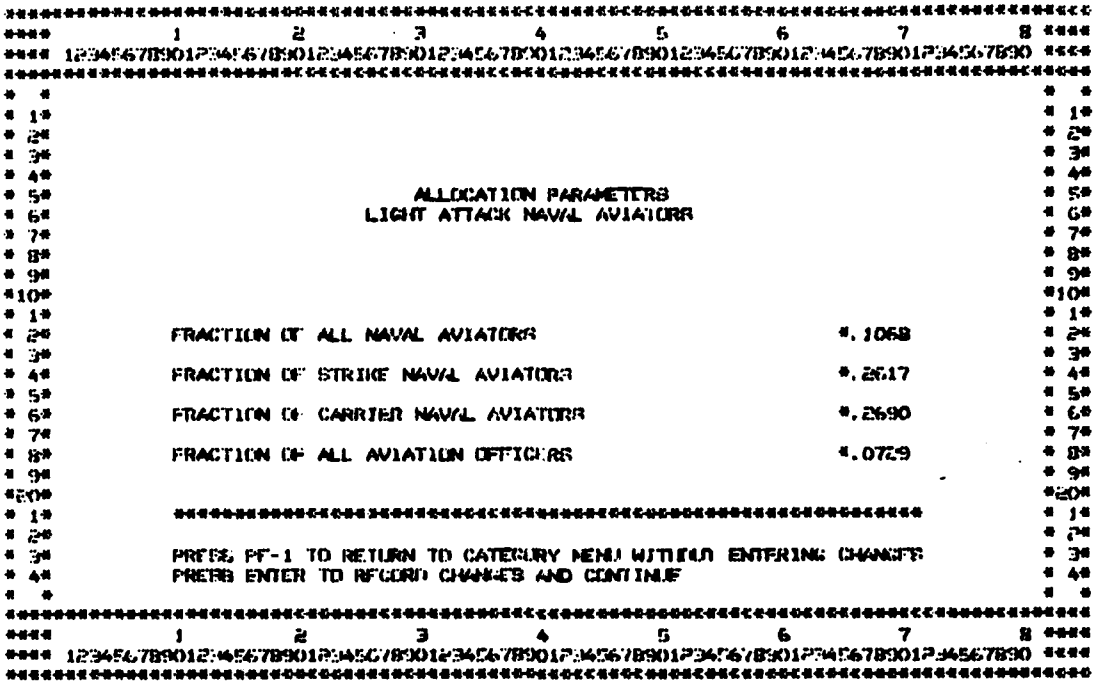
This screen displays the three policy variables that the user may change in order to check the results of different policy alternatives. The Plowback instructors are training command graduates who are assigned immediately as instructors in undergraduate training.

After entering the changes, the user would press "ENTER" in order to record changes and continue processing. The user would then be returned to the category selection screen.



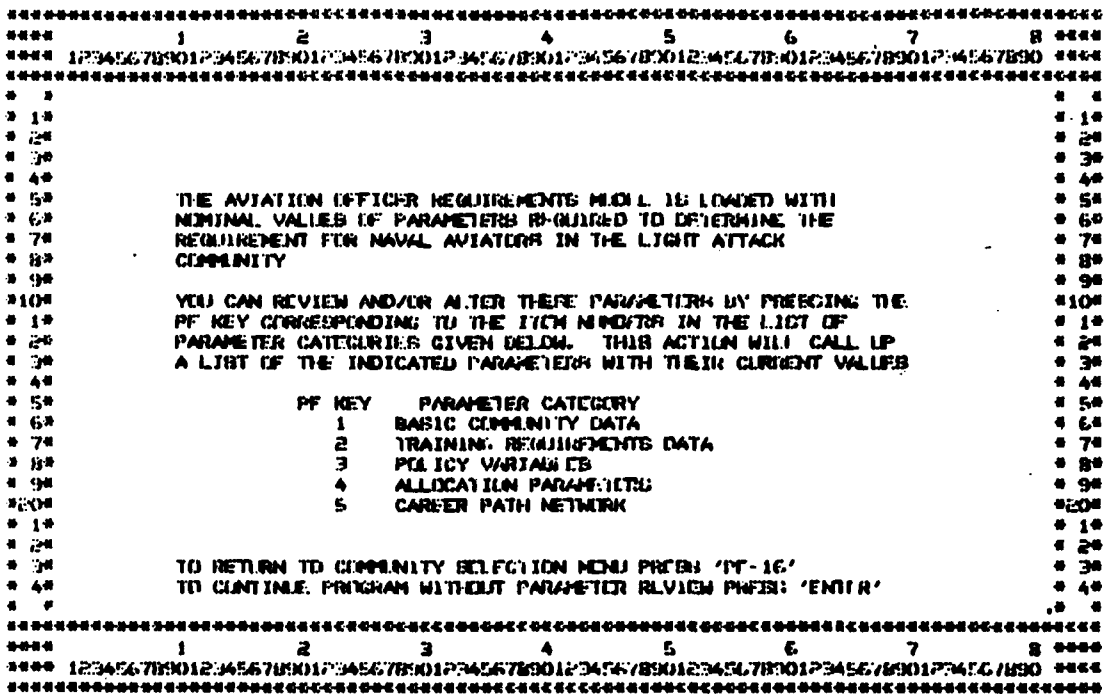
CATEGORY SELECTION MENU SCREEN

If the user wishes to change existing parameters in the Allocation Parameters, he must depress the PF-4 key. Upon selecting Allocation Parameters, the screen on the next page of this appendix would appear.



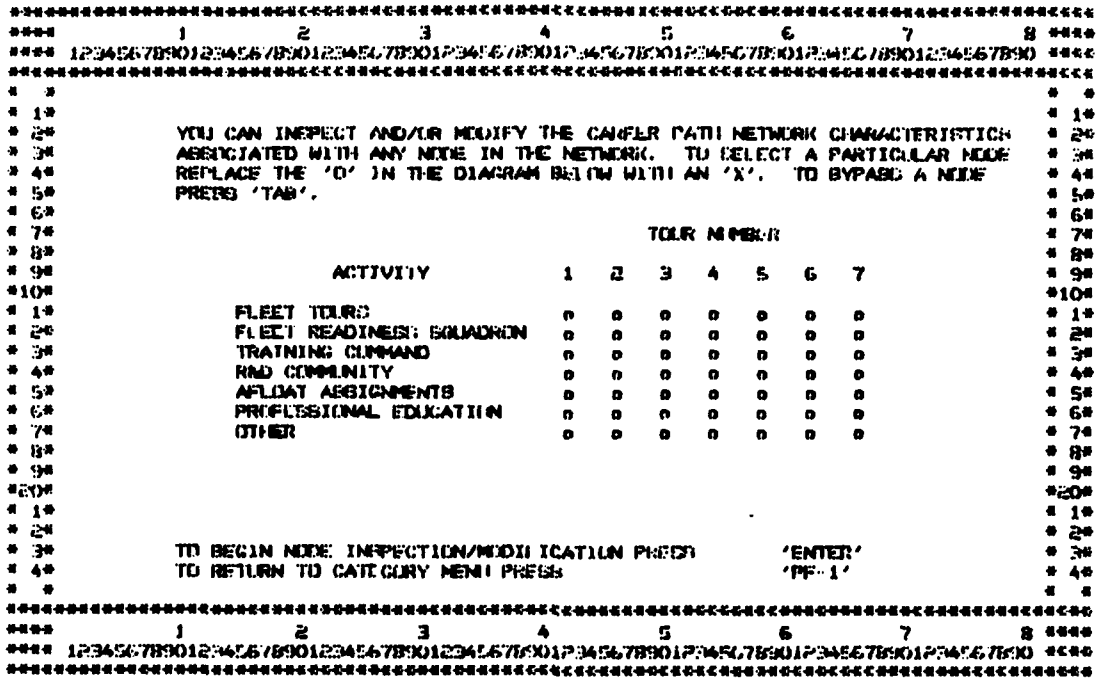
ALLOCATION PARAMETER CHANGE SCREEN

This screen displays four allocation parameters that the user is allowed to change. After making appropriate changes, the user may depress the PF-1 key in order to return to Category Menu without entering changes or the user may press "ENTER" in order to record the changes and continue. Depression of either key will return the user to the Category Selection Menu screen.



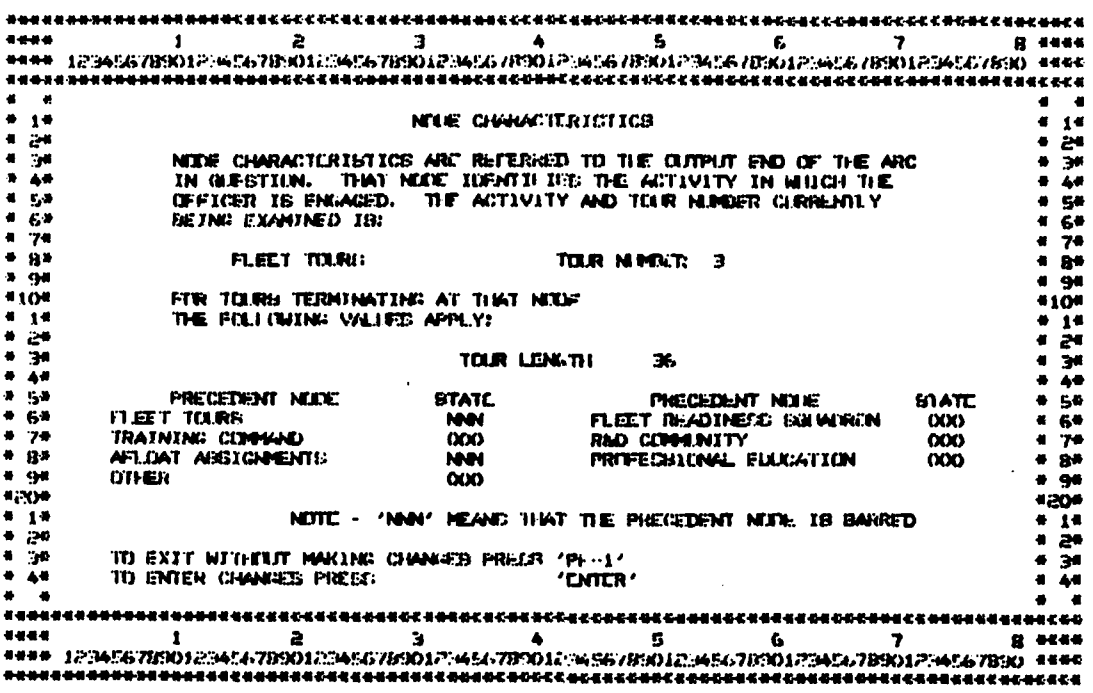
CATEGORY SELECTION MENU SCREEN

If the user wishes to change or review the existing parameter values in Career Path Network, he must depress the PF-5 key. Upon selecting the Career Path Network, the screen on the next page of this appendix will appear.



CAREER PATH NETWORK CHANGE SCREEN #1

This screen display allows the user to inspect/modify any Career Path Network characteristic. By replacing any o with an x on the presented table and pressing "ENTER", the user may inspect that particular node. For each x that is entered, if the "ENTER" key is depressed, the screen on the next page of this appendix will appear. After all x's have been inspected, the Category Selection Menu screen will reappear.



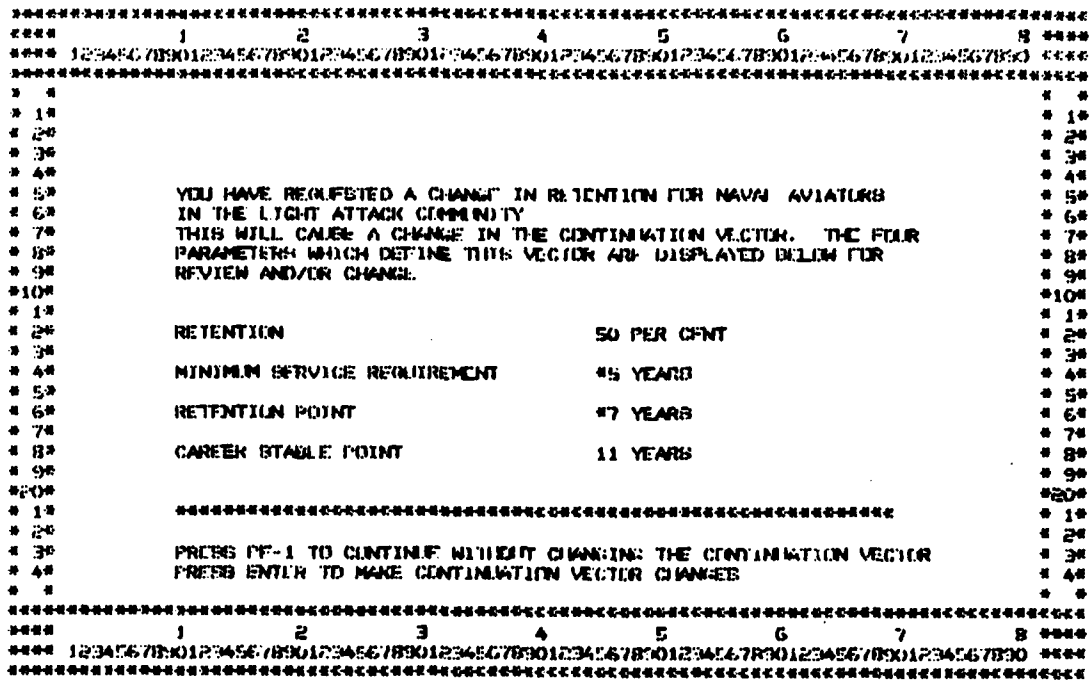
CAREER PATH NETWORK CHANGE SCREEN #2

This screen reconfirms the activity and tour number that the user has chosen to inspect. At this point, the user may change the value of the tour length and bar or make available any of the seven precedent nodes. Once the user has made required changes and is ready to record the changes, he must depress the "ENTER" key. This screen will appear for each x that the user placed into the table on the previous screen. Once all x's have been inspected/modified, the system will return the user to the Category Menu Selection screen.

```
********************************************************************************
****      1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
********************************************************************************
*  *                                                                           *  *
* 1*                                                                           * 1*
* 2*                                                                           * 2*
* 3*                                                                           * 3*
* 4*                                                                           * 4*
* 5*          THE AVIATION OFFICER REQUIREMENTS MODEL IS LOADED WITH           * 5*
* 6*          NOMINAL VALUES OF PARAMETERS REQUIRED TO DETERMINE THE           * 6*
* 7*          REQUIREMENT FOR NAVAL AVIATORS IN THE LIGHT ATTACK               * 7*
* 8*          COMMUNITY                                                        * 8*
* 9*                                                                           * 9*
*10*          YOU CAN REVIEW AND/OR ALTER THESE PARAMETERS BY PRESSING THE      *10*
* 1*          PF KEY CORRESPONDING TO THE ITEM NUMBERS IN THE LIST OF          * 1*
* 2*          PARAMETER CATEGORIES GIVEN BELOW.  THIS ACTION WILL CALL UP      * 2*
* 3*          A LIST OF THE INDICATED PARAMETERS WITH THEIR CURRENT VALUES     * 3*
* 4*                                                                           * 4*
* 5*                    PF KEY    PARAMETER CATEGORY                         * 5*
* 6*                       1      BASIC COMMUNITY DATA                       * 6*
* 7*                       2      TRAINING REQUIREMENTS DATA                 * 7*
* 8*                       3      POLICY VARIABLES                           * 8*
* 9*                       4      ALLOCATION PARAMETERS                      * 9*
*20*                       5      CAREER PATH NETWORK                        *20*
* 1*                                                                           * 1*
* 2*                                                                           * 2*
* 3*          TO RETURN TO COMMUNITY SELECTION MENU PRESS 'PF-16'              * 3*
* 4*          TO CONTINUE PROGRAM WITHOUT PARAMETER REVIEW PRESS 'ENTER'       * 4*
*  *                                                                           *  *
********************************************************************************
****      1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
********************************************************************************
```

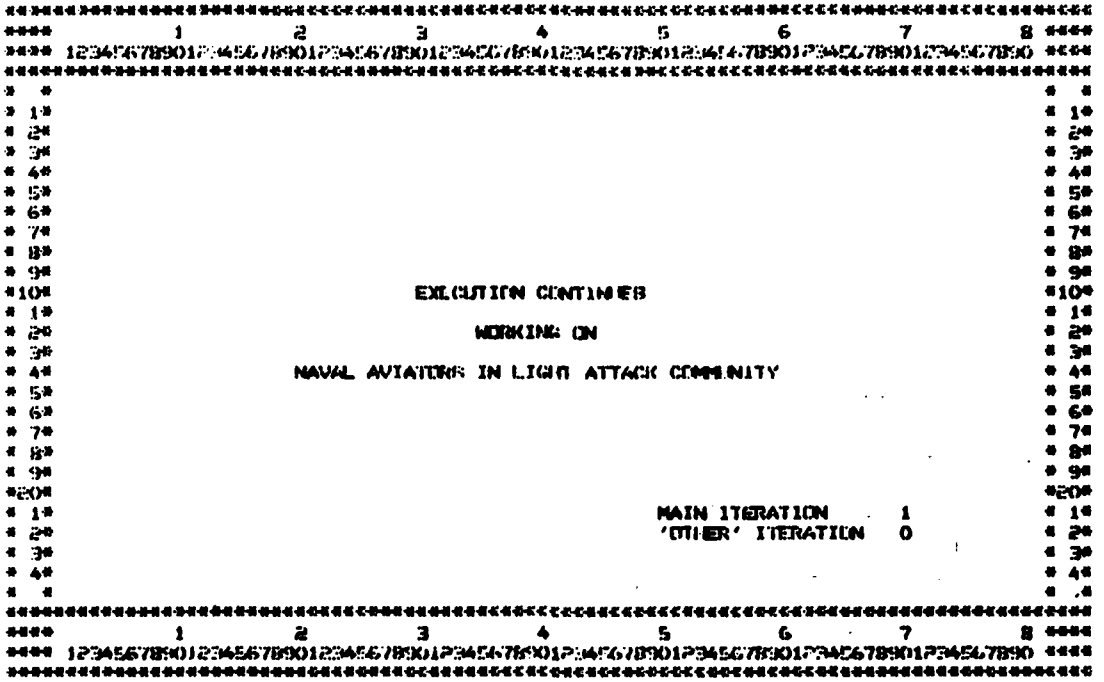
CATEGORY MENU SELECTION SCREEN

Having made all changes required, the user should be ready to obtain a subcommunity solution. This is done by pressing the "ENTER" key. If the user has changed the retention value in the Basic Community Data Change screen, the screen on the next page of this appendix will appear. Otherwise, the Execution screen will appear.



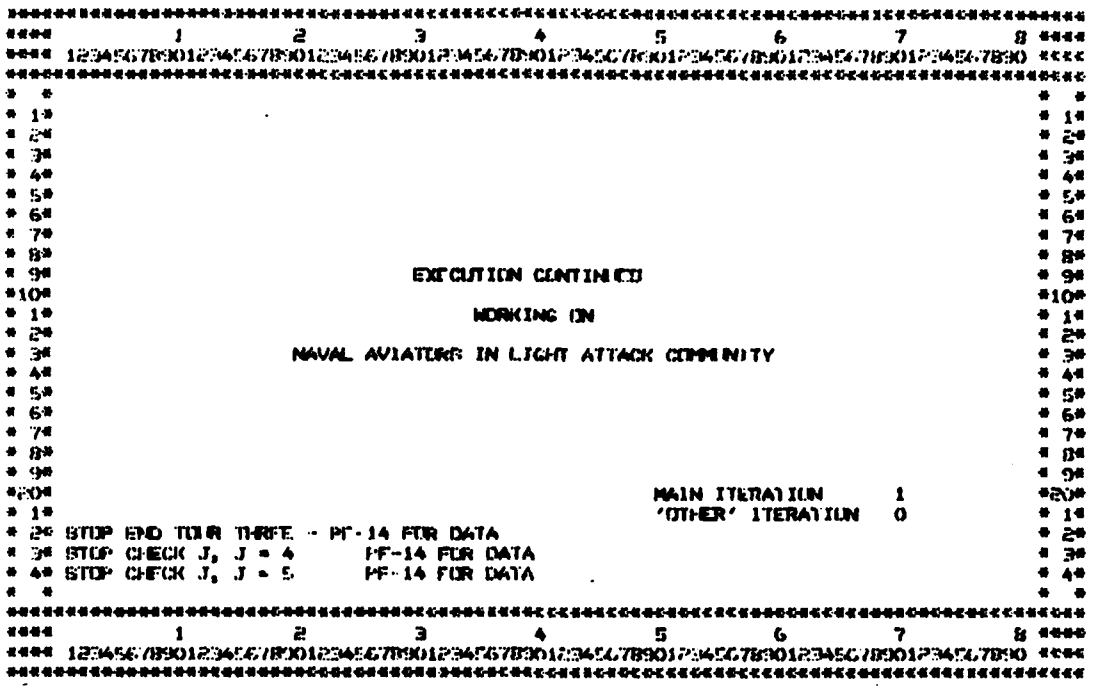
RETENTION SCREEN

When the user has requested a change in retention, this screen appears. A change in retention will cause the Continuation Vector to change. This screen displays the four parameters that determine Continuation Vector and offers the user the opportunity to change these parameters or continue the process.



EXECUTION SCREEN

This screen lets the user know that the system is processing the information that has been entered. If, in the screen presented earlier, the user had chosen to not have In-Process Monitoring at the end of each iteration, the Results/Continue screen will appear to show results at that stage. The user would press "ENTER" to continue and this screen would reappear with the next iteration number.



EXECUTION SCREEN (IN-PROCESS MONITORING)

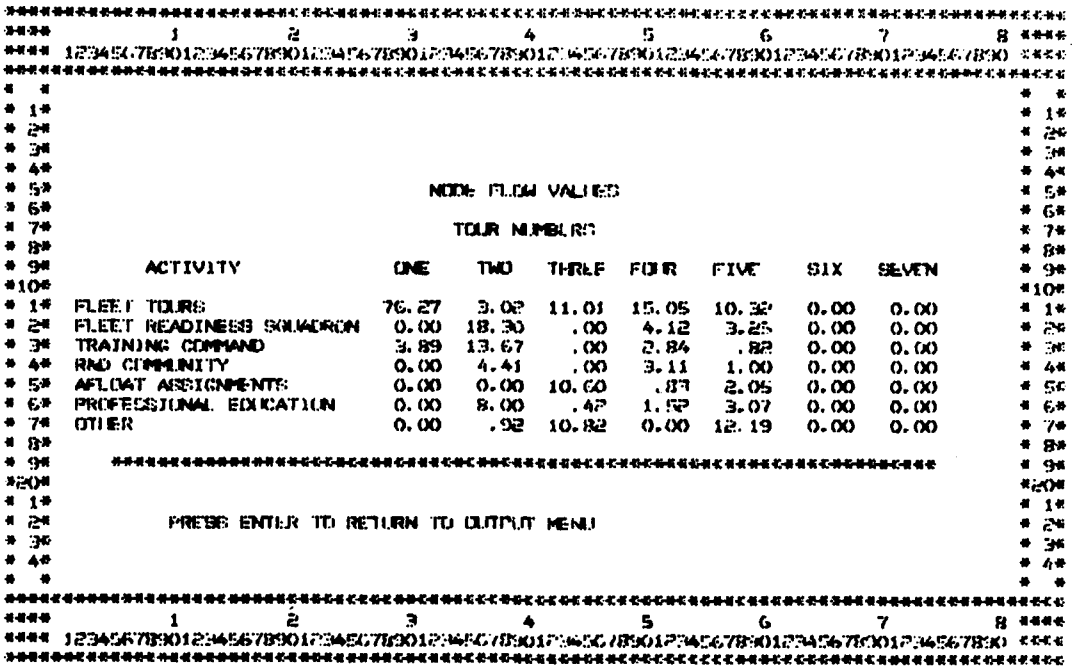
This screen lets the user know that the information he has entered is being processed. In the In-Process Monitoring mode, the user may stop and check the data at one or all stop check points. This is done by pressing PF-14. If the user presses PF-14, the screen on the next page will appear.

```
WORKING ON NAVAL AVIATORS IN LIGHT ATTACK COMMUNITY
                                                    05/17/82
RESPONSE TO STOP CHECK J, J = 5                     15:35

                    FRACTION OF FILL
              SENIOR COMMANDERS      0.000
              COMMANDERS              .001
              LT. COMMANDERS          .683
              LT. AND BELOW           .956

         ACCESSIONS                    80.86
         FIRST TOUR LENGTH             48.00

         OUTPUT OPTIONS, PRESS PF KEY:
              1. NODE FLOWS    2. INVENTORY      3. REQUIREMENTS
              4. EXCESS FLOW
         FOR SCREEN PRINTS PRESS PF-11
         PRESS ENTER TO CONTINUE PROGRAM
```

OUTPUT MENU SCREEN

At each stop check, if the user presses PF-14, this screen is displayed showing the user the extent to which the requirements have been filled thus far. At this point, the user may choose to look at any of the four available output options. If the user presses the PF-1 key, the screen on page A-27 of this appendix will appear.

The only time this screen appears automatically is at the end of each main iteration. The user would press the "ENTER" key and processing would then continue.



NODE FLOW VALUES

TOUR NUMBERS

ACTIVITY	ONE	TWO	THREE	FOUR	FIVE	SIX	SEVEN
FLEET TOURS	76.27	3.02	11.01	15.05	10.32	0.00	0.00
FLEET READINESS SQUADRON	0.00	18.30	.00	4.12	3.25	0.00	0.00
TRAINING COMMAND	3.89	13.67	.00	2.84	.82	0.00	0.00
RND COMMUNITY	0.00	4.41	.00	3.11	1.00	0.00	0.00
AFLOAT ASSIGNMENTS	0.00	0.00	10.60	.87	2.05	0.00	0.00
PROFESSIONAL EDUCATION	0.00	8.00	.42	1.52	3.07	0.00	0.00
OTHER	0.00	.92	10.82	0.00	12.19	0.00	0.00

PRESS ENTER TO RETURN TO OUTPUT MENU

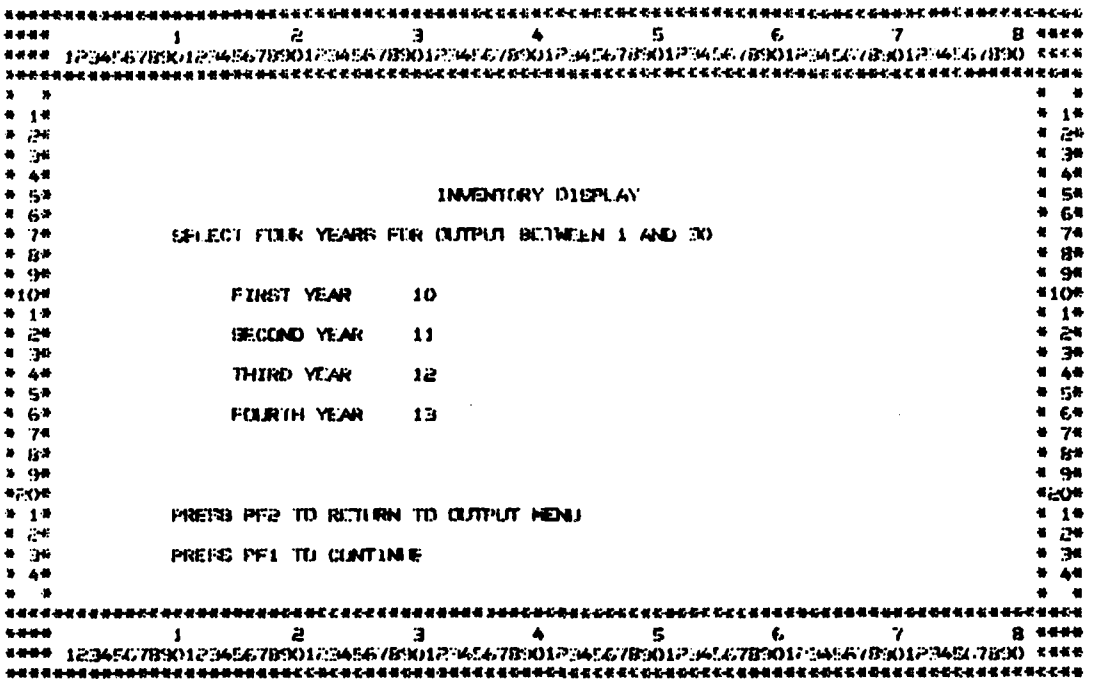
NODE FLOW OUTPUT SCREEN

This screen displays the node flow values which are the annual flows of officers out of the various nodes of the career path network. Flows will be shown through the tour that the model has completed processing. In order to return to the screen on page A-26, the user must press "ENTER".

```
WORKING ON NAVAL AVIATORS IN LIGHT ATTACK COMMUNITY
                                                    05/17/82
RESPONSE TO STOP CHECK J, J + 5                     15:35

                    FRACTION OF FILL
              SENIOR COMMANDERS      0.000
              COMMANDERS              .001
              LT. COMMANDERS          .683
              LT. AND BELOW           .956

         ACCESSIONS                    80.86
         FIRST TOUR LENGTH             48.00

         OUTPUT OPTIONS. PRESS PF KEY:
              1. NODE FLOWS    2. INVENTORY        3. REQUIREMENTS
              4. EXCESS FLOW
         FOR SCREEN PRINTS PRESS PF-11
         PRESS ENTER TO CONTINUE PROGRAM
```

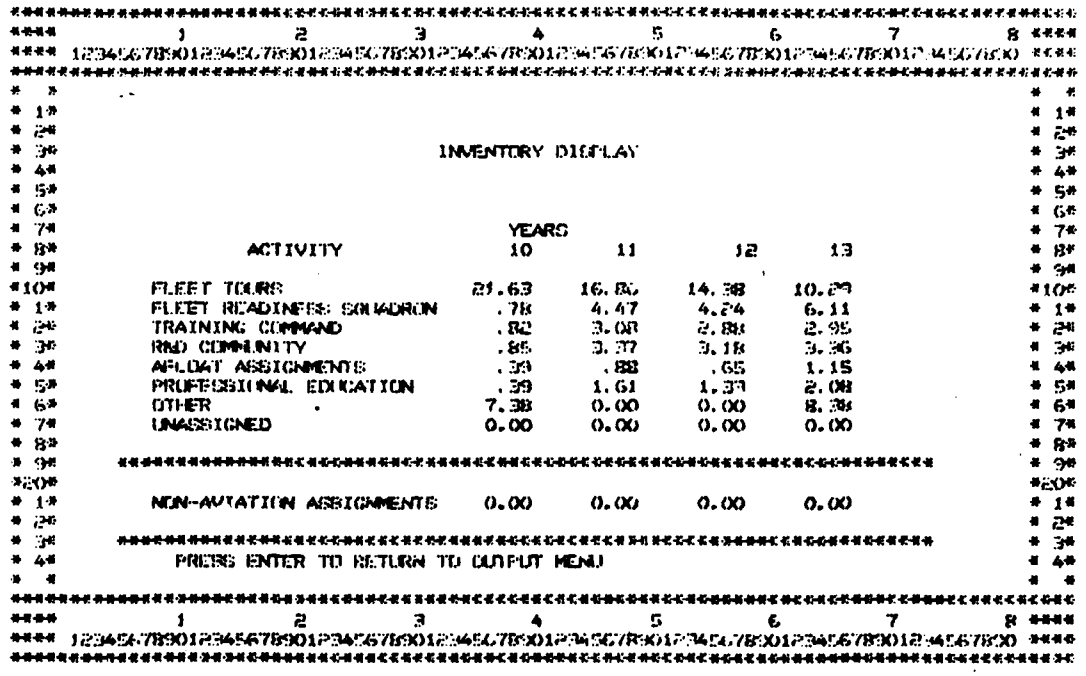
OUTPUT MENU SCREEN

If the user wishes to see the Inventory Output, he must depress the PF-2 key. Inventory consists of two screens - the first of which appears on the next page of this appendix.



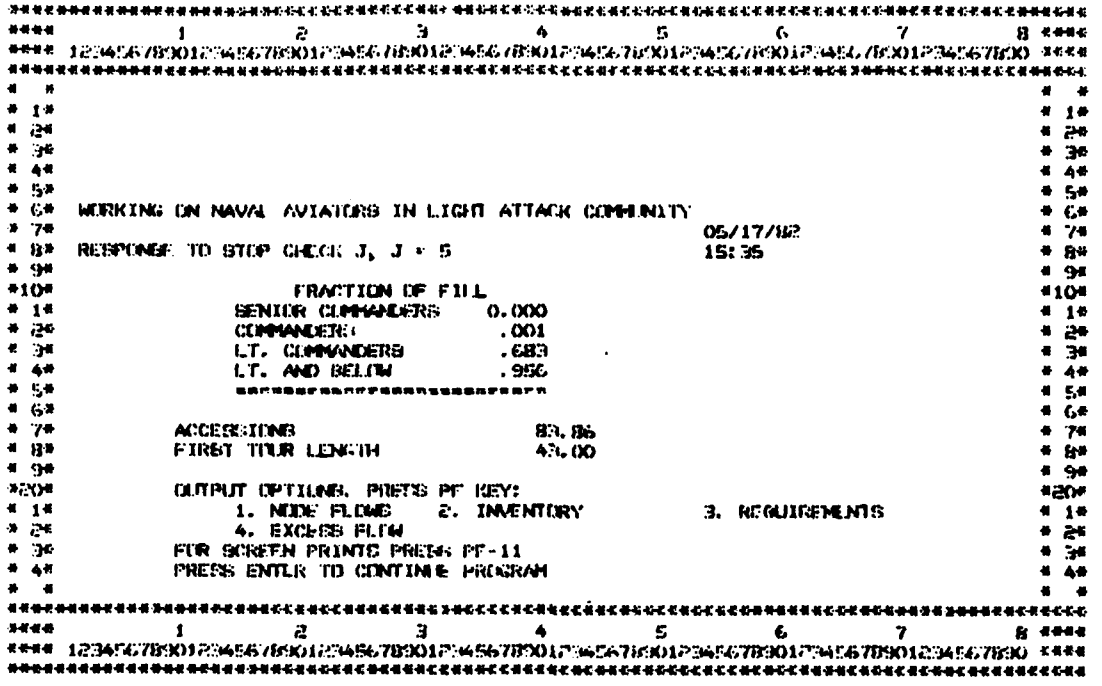
INVENTORY DISPLAY OUTPUT SCREEN #1

This is the first of the Inventory Output screens. Here the user enters the years for which he would like to see the Inventory displayed. After entering these years, the user should depress the PF-1 key to see the requested output, which is presented on the next page of this appendix.



INVENTORY DISPLAY OUTPUT SCREEN #2

This screen displays the breakdown for each activity and the years the user has requested. In order to return to the Output Menu screen, the user must press the "ENTER" key.



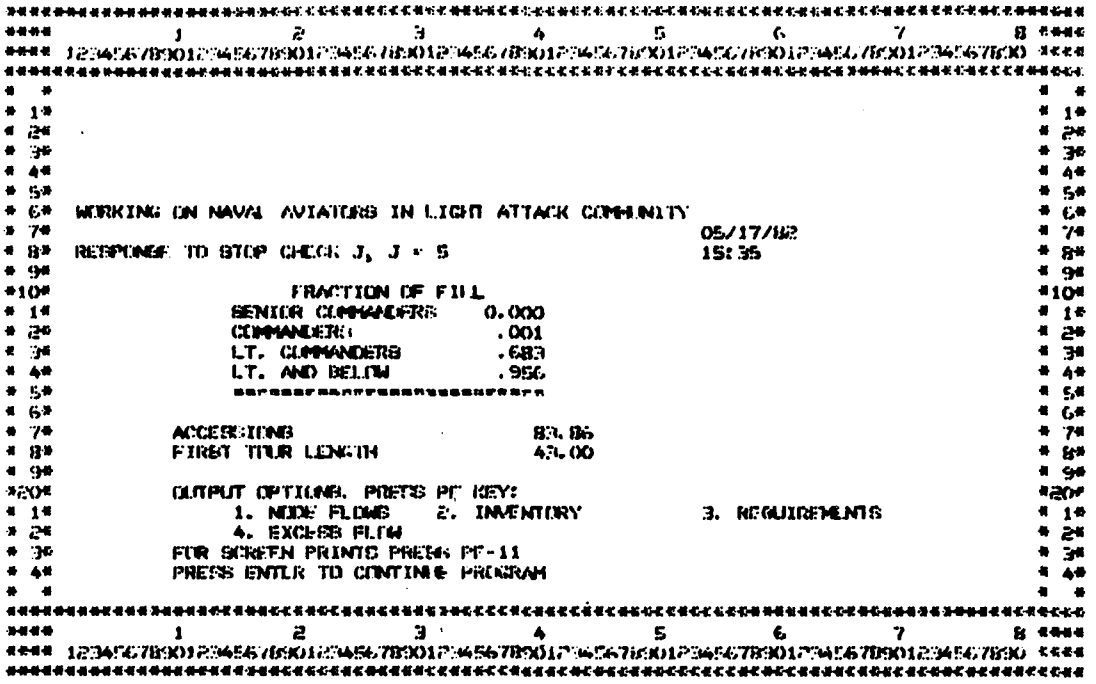
OUTPUT MENU SCREEN

If the user wishes to see the Requirements Output, he must depress the PF-3 key. If the user presses the PF-3 key, the screen on the next page of this appendix appears.

```
                                REQUIREMENTS DISPLAY

                                    CATEGORY
            ACTIVITY                  LT        LCDR       CDR        CDR4

      FLEET TOURS                      .00      37.58      48.00       3.22
      FLEET READINESS SQUADRON        0.00       0.00       6.00       2.00
      TRAINING COMMAND                0.00       0.00       5.75       0.00
      R&D COMMUNITY                   0.00       0.00       2.69       2.77
      AFLOAT ASSIGNMENTS              0.00       7.00      10.35      10.25
      PROFESSIONAL EDUCATION          0.00       0.00       6.15       0.00
      OTHER                          24.88      30.09      30.86      30.86

      LOWER GRADE FILLS                                      .28        .14       0.00

         PRESS ENTER TO RETURN TO OUTPUT MENU
```

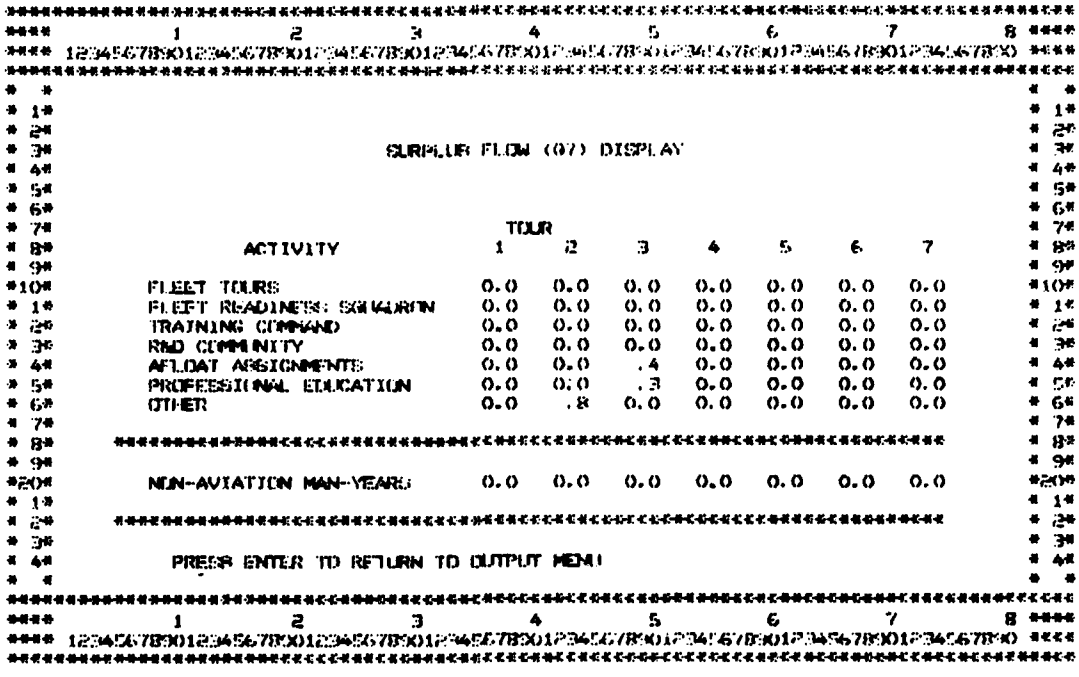
REQUIREMENTS DISPLAY OUTPUT SCREEN

This screen displays the requirements remaining to be filled for each grade in each activity up to the point to which the system has processed thus far. In order to get back to the Output Menu screen, the user must press the "ENTER" key.



OUTPUT MENU SCREEN

If the user wishes to see the output concerning Excess Flow, he must depress the PF-4 key. If the user presses the PF-4 key, the screen on the next page of this appendix appears.



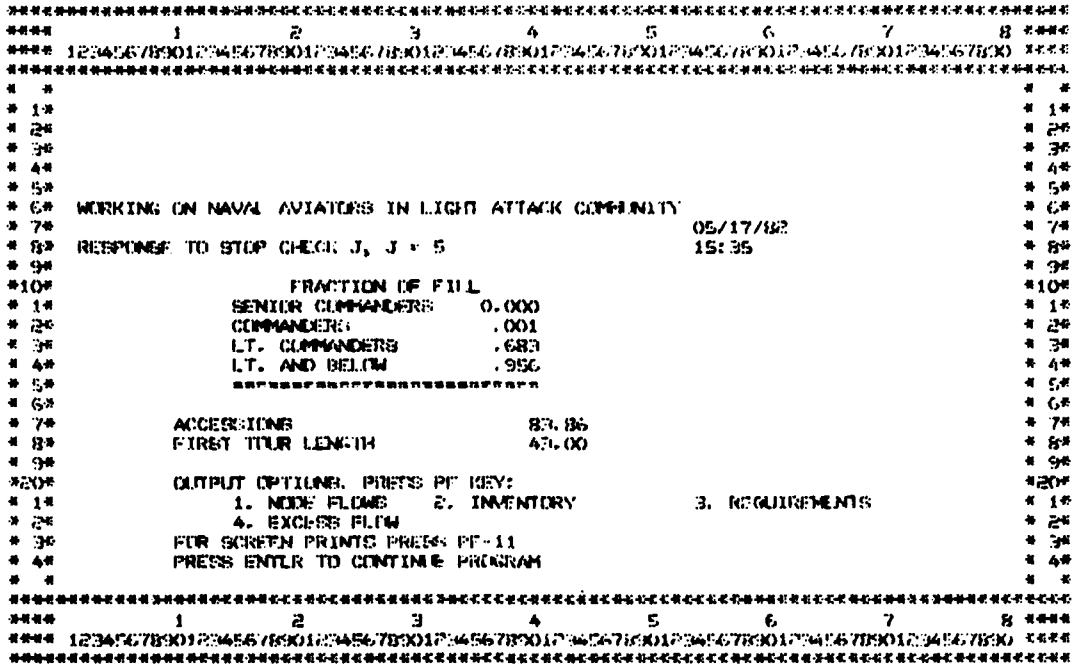
SURPLUS FLOW (07) DISPLAY

ACTIVITY	TOUR 1	2	3	4	5	6	7
FLEET TOURS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FLEET READINESS SQUADRON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRAINING COMMAND	0.0	0.0	0.0	0.0	0.0	0.0	0.0
R&D COMMUNITY	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AFLOAT ASSIGNMENTS	0.0	0.0	.4	0.0	0.0	0.0	0.0
PROFESSIONAL EDUCATION	0.0	0.0	.3	0.0	0.0	0.0	0.0
OTHER	0.0	.8	0.0	0.0	0.0	0.0	0.0
NON-AVIATION MAN-YEARS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PRESS ENTER TO RETURN TO OUTPUT MENU

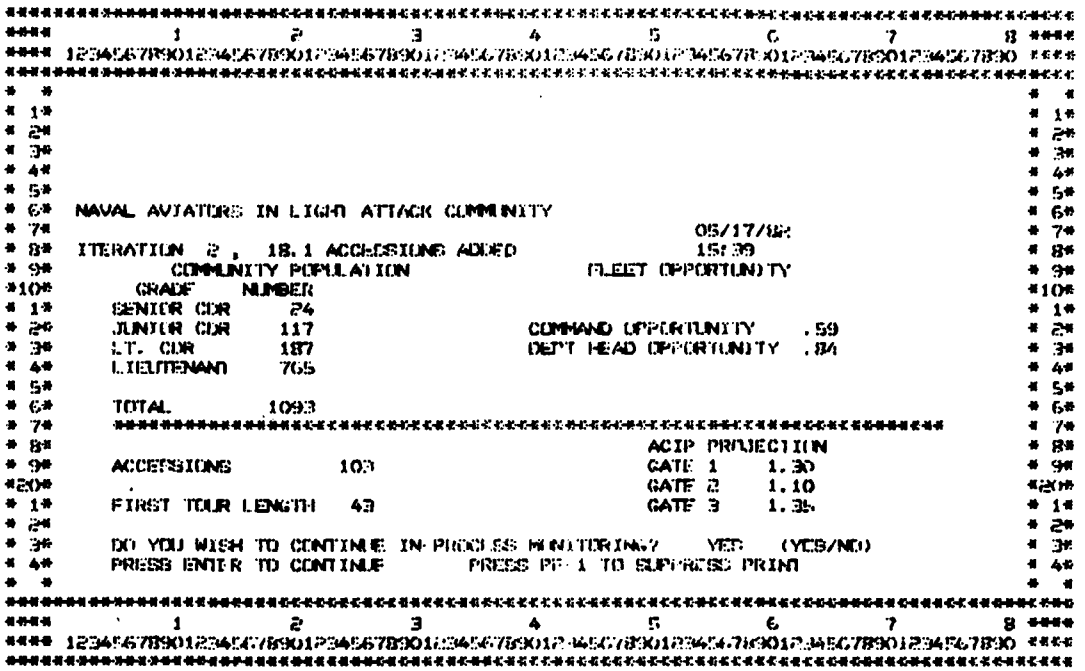
EXCESS FLOW OUTPUT SCREEN

This screen shows the Excess Flow out of the node that the model could not assign up to this point in the processing.



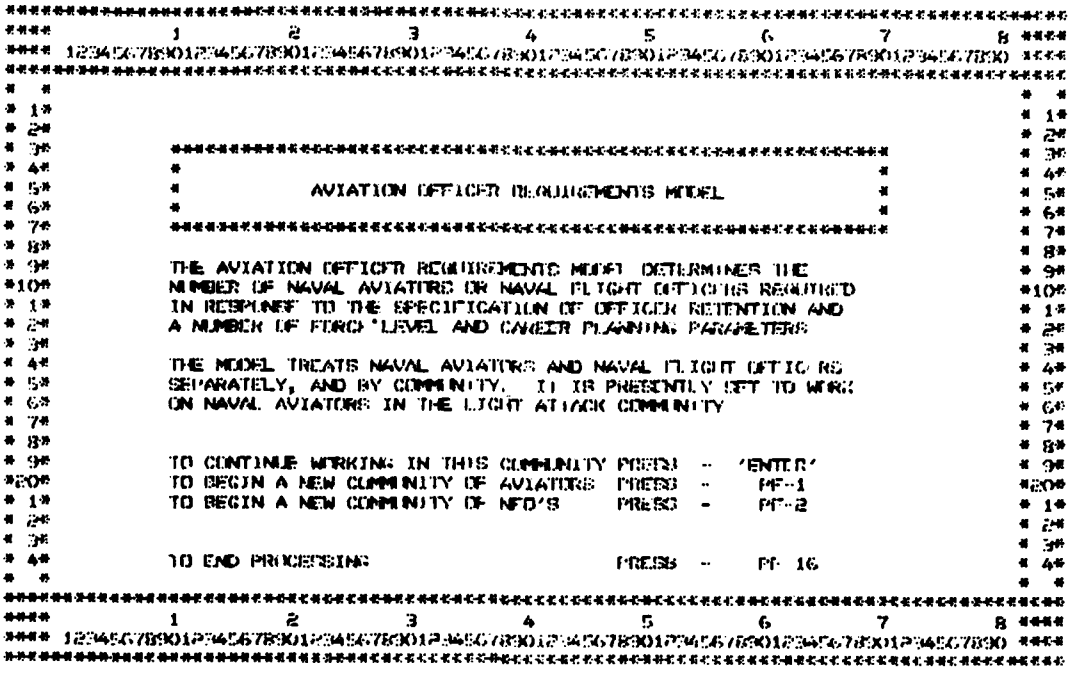
OUTPUT SCREEN

This is the Output Screen. This screen identifies for the user the requirements that have been filled and/or met. If this screen appears in the In-Process Mode, the data is only valid for that portion of the system that has run to that point. However, at the end of Iterations, this screen would be the solution to the model.



RESULT/CONTINUE SCREEN

This screen allows the user to get out of the In-Process Monitoring. It also displays the results of the model at the current iteration.



COMMUNITY SELECTION MENU SCREEN

After the system has met all requirements, this screen will reappear giving the user the opportunity to run another series or to end processing. If the user is finished, he should press PF-16. Only when the PF-16 key is pressed will the user receive printed output from the model. The pages following this screen are outputs from the Aviation Officer Requirements Model.

LIGHT ATTACK COMMUNITY

SUMMARY DATA

NAVAL AVIATORS

06/09/82
12:19

RETENTION	65 %	NUMBER OF SQUADRONS	24
		AIRCRAFT PER SQUADRON	12
PLOWBACK FRACTION	5 %	CREW FACTOR	1.42
		NAVAL AVIATORS PER CREW	1.00

COMMUNITY POPULATION

ACCESSIONS TO TRAINING (139X)	164	SENIOR COMMANDERS	45		
		COMMANDERS	83	COMMAND OPPORTUNITY	.77
ACCESSIONS TO 131X DESIGNATOR	116	LT. COMMANDERS	211	DEPT HEAD OPPORTUNITY	1.16
FIRST TOUR LENGTH	36	LIEUTENANTS	852		
		TOTALS	1191		

DISTRIBUTION BY GRADE AND ACTIVITY

ACTIVITY	GRADE					
	LT	LCDR	CDR	SEN CDR	TOTAL	ACIP PROJECTIONS
FLEET TOURS	391	97	58	6	552	
FLEET READINESS SQUADRON	107	6	0	2	115	GATE 1 1.41
TRAINING COMMAND	108	14	0	0	122	GATE 2 1.18
R3D COMMUNITY	36	2	3	0	41	GATE 3 1.44
AFLOAT ASSIGNMENTS	42	8	8	3	61	
PROFESSIONAL EDUCATION	40	7	0	0	47	
OTHER	114	54	14	30	212	NON AVIATION 3 %
NON-AVIATION ASSIGNMENTS	13	19	0	4	36	

ALL REQUIREMENTS MET

ITERATIONS = 27 1

NAVAL AVIATORS

LIGHT ATTACK COMMUNITY

INVENTORY DISPLAY 06/09/82 12:19

YEARS OF AVIATION SERVICE

ACTIVITY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	22	24	26
FLEET TOURS	113	108	112	6	5	4	4	3	12	29	40	36	20	1	12	22	1	0	0	0
FLEET READINESS SQUADRON	0	0	0	30	30	25	22	0	0	0	6	0	0	0	0	0	1	0	0	0
TRAINING COMMAND	6	4	1	32	32	26	2	0	0	3	5	8	1	0	0	0	0	0	0	0
R&D COMMUNITY	0	0	0	7	7	6	2	5	5	4	1	1	0	0	1	1	0	0	0	0
AFLOAT ASSIGNMENTS	0	0	0	0	0	8	14	12	6	2	1	7	0	0	4	0	1	0	0	0
PROFESSIONAL EDUCATION	0	0	0	14	14	2	2	4	3	1	0	0	3	4	0	0	0	0	0	0
OTHER	0	0	0	22	21	21	9	17	14	10	0	0	11	22	12	2	9	2	1	0
UNASSIGNED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NON-AVIATION ASSIGNMENTS	0	0	0	0	0	0	7	6	0	0	0	1	2	7	0	0	2	0	0	0

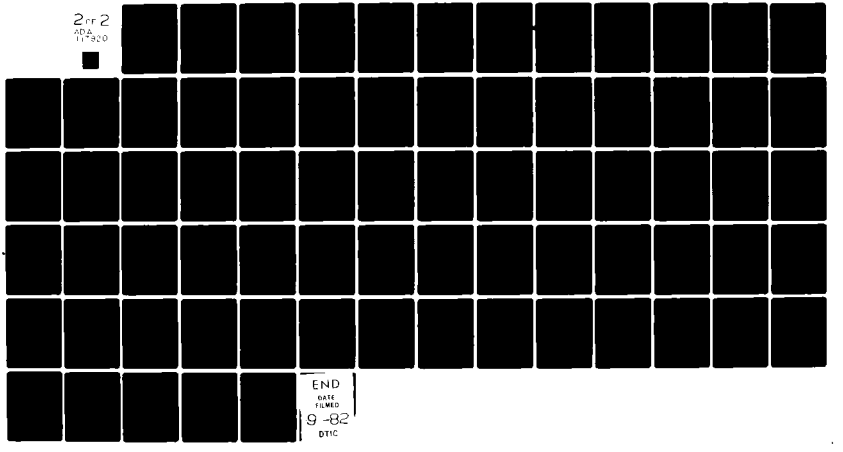
APPENDIX B.

PROGRAM LISTING

```
000010 ************************************************************
000020 *                                                          *
000030 *            AVIATION OFFICER REQUIREMENTS MODEL           *
000040 *                       VERSION 5.0                        *
000050 *                                                          *
000060 ************************************************************
000070 DIM RO(30),INVT(9,31),NO(7),T9$(7,7)26,T8(12),T7(12),GO(15,12),   !
000080 OTH(3,8),INVTO(31),I4(7,7),T5(12),T6(12),LABEL$(9)25,A2(7,7)
000090 DIM S1(15,5),A1(15,9),TCO(7,5),PO(10),DO(7,4),AUX(15,6),X$70,     !
000100 Q4(7,4),OUTA(8),NET$(10)130,C$70,Q38(7),T15(12),T$5,D$8,E$130
000110 DIM D8(4),D9(4),TYPE$(14)30,A$22,Z1$5,P1$(9)70,POSIT$(5)64,Q7(7,7)
000120 DIM T17(12),T18(12),Q37(4),Z3$3,N$2,B$70,A50(7),T10$(7,7)26
000130 DIM N9$(7,7)1,TDES$30,DES$30
000140 COM X4$130,X5$130,TRA$(7)25,PTR(9)
000150 ************************************************************
000160 *                                                          *
000170 *          THIS FIRST SECTION OF THE PROGRAM DEFINES       *
000180 *          AND LOADS THE BASIC MATRICES RO,GO,S1,A1        *
000190 *          TCO AND T9$                                     *
000200 *                                                          *
000210 ************************************************************
000220 REM CONTINUATION MATRIX
000230 DATA 5,2,4,8,1,6,4                                  /*STRUCTURE*/
000240 DATA .986,.676,.924,.980,.292,.652,0                 /*VALUES*/
000250 REM GRADE MATRIX GO
000260 REM SQ PILOT/NFO;FRS PILOT/NFO 05,04,03-
000270 DATA 2,4,11,0,0,0,8,23,85,0,0,0                      /*VAL*/
000280 DATA 1,2,11,1,2,11,8,23,137,4,15,77                  /*VF */
000290 DATA 1,2,13,1,2,13,2,5,44,2,6,31                     /*VAM*/
000300 DATA 1,2,7,1,2,12,2,6,34,2,5,33                      /*VAW*/
000310 DATA 1,2,3,1,3,14,1,3,38,1,3,76                      /*VAQ*/
000320 DATA 1,3,16,1,3,15,1,8,47,1,[illegible],24           /*VS */
000330 DATA 2,4,14,0,0,0,4,17,57,[illegible],0              /*HS*/
000340 DATA 1,3,34,1,3,19,2,15,76,[illegible],9,53          /*VP*/
000350 DATA 2,4,14,0,0,0,4,17,51,0,0,0                      /*HSL1*/
000360 DATA 2,17,41,0,0,0,2,13,39,0,0,0                     /*HSL2*/
000370 DATA 0,0,0,0,0,0,0,0,0,0,0,0                         /*VQ  */
000380 DATA 0,0,0,0,0,0,0,0,0,0,0,0                         /*FSJ */
000390 DATA 0,0,0,0,0,0,0,0,0,0,0,0                         /*FSP */
000400 DATA 0,0,0,0,0,0,0,0,0,0,0,0                         /*FSH */
000410 DATA 1,3,1,0,0,0,0,0,0,0,0,0                         /*WING*/
000420 REM SQUADRON MATRIX S1
000430 REM NO SQ, A/C /SQ, CREW FACT,PILOT/CREW, NFO/CREW
000440 DATA 24,12,1.42,1,0                                  /*VAL*/
000450 DATA 24,12,1.17,1,1                                  /*VF */
000460 DATA 12,14,1.14,1,1                                  /*VAM*/
000470 DATA 12,3,1.66,2,3                                   /*VAW*/
000480 DATA 9,4,1.5,1,3                                     /*VAQ*/
000490 DATA 11,9,1.44,1.5,1.5                               /*VS */
000500 DATA 11,6,1.66,2,0                                   /*HS */
000510 DATA 24,9,1.33,3,2                                   /*VP */
000520 DATA 6,11,2,2,0                                      /*HSL1*/
```

```
000530 DATA 8,15,2,2,0                                          /*HSL2*/
000540 DATA 0,0,0,0,0                                           /*VQ  */
000550 DATA 0,0,0,0,0                                           /*FSJ */
000560 DATA 0,0,0,0,0                                           /*FSP */
000570 DATA 0,0,0,0,0                                           /*FSH */
000580 DATA 12,0,0,0,0                                          /*WING*/
000590 REM ALLOCATION MATRIX A1
000600 REM PILOT PIPE,NFO PIPE, PILOTS-ALL,COMMUNITY,CV,NFO - ALL,     !!
000610 COMMUNITY,CV, ALL
000620 DATA 1,0,.1068,.2617,.2690,0,0,0,.0729                    /*VAL*/
000630 DATA 1,4,.0838,.2053,.2110,.1797,1.0,.3101,.1142          /*VF */
000640 DATA 1,5,.0475,.1163,.1195,.1011,.3536,.1744,.0645        /*VAM*/
000650 DATA 1,6,.0311,.0762,.0783,.0929,1,.1604,.0507            /*VAW*/
000660 DATA 1,5,.0197,.0483,.0496,.0965,.3375,.1565,.0441        /*VAQ*/
000670 DATA 1,5,.0508,.1245,.1279,.1092,1,.1885,.0694            /*VS */
000680 DATA 3,0,.0575,.1883,.1447,0,0,0,.0392                    /*HS */
000690 DATA 2,7,.2210,.8737,0,.3047,.9170,0,.2476                /*VP */
000700 DATA 3,0,.0628,.2057,0,0,0,0,.0430                        /*HSL1*/
000710 DATA 3,0,.1141,.3741,0,0,0,0,.0782                        /*HSL2*/
000720 DATA 1,7,.0337,.0826,0,.0383,.3089,0,.0510                /*VQ */
000730 DATA 1,7,.1004,.0852,0,.0276,.0329,0,.0773                /*FSJ*/
000740 DATA 2,7,.1004,.1263,0,.0276,.0329,0,.0773                /*FSP*/
000750 DATA 3,0,.0708,.2919,0,0,0,0,.0483                        /*FSH*/
000760 DATA 1,1,.3972,0,1.0,.5794,0,1.0,.4550                    /*WING*/
000770 REM AUXILLIARY MATRIX AUX
000780 REM PILOT/NFO TOTALS - 05,04,03-
000790 DATA 0,12,18,0,0,0                                        /*AUX VA*/
000800 DATA 0,6,6,0,4,8                                          /*AUX VF*/
000810 DATA 0,4,0,0,2,0                                          /*AUX VAM*/
000820 DATA 0,2,2,0,2,0                                          /*AUX VAW*/
000830 DATA 2,4,21,1,5,29                                        /*AUX VAQ*/
000840 DATA 0,0,0,0,0,0                                          /*AUX VS*/
000850 DATA 2,10,4,0,0,0                                         /*AUX HS*/
000860 DATA 0,56,6,0,17,27                                       /*AUX VP*/
000870 DATA 0,6,0,0,0,0                                          /*AUX HSL1*/
000880 DATA 0,0,0,0,0,0                                          /*AUX HSL2*/
000890 DATA 4,20,117,3,12,140                                    /*AUX VQ */
000900 DATA 25,96,247,6,10,47                                    /*AUX FSJ*/
000910 DATA 2,10,38,2,4,23                                       /*AUX FSP*/
000920 DATA 16,65,276,0,0,0                                      /*AUX FSH*/
000930 DATA 0,0,0,0,0,0                                          /*AUX WING*/
000940 REM TRAINING COMMAND MATRIX TCO
000950 REM J,P,H,RIO,TN,ATOS,NAV.
000960 REM I/O RATIO, 05, 04, IP, INFO
000970 DATA 1.405,22,44,.860,0                                   /*JET*/
000980 DATA 1.291,7,14,.443,0                                    /*PROP*/
000990 DATA 1.347,7,14,.542,0                                    /*HELO*/
001000 DATA 1.791,1,2,.180,.255                                  /*RIO */
001010 DATA 1.771,1,2,.118,.156                                  /*TN  */
001020 DATA 1.523,1,2,.070,.079                                  /*ATOS*/
001030 DATA 1.426,1,2,.030,.088                                  /*NAV */
001040 REM POLICY VECTOR
```

AD-A117 920 INFORMATION SPECTRUM INC ARLINGTON VA F/G 5/9
AVIATION OFFICER REQUIREMENTS STUDY.(U)
MAY 82 F E O'CONNOR N00014-81-C-0368
UNCLASSIFIED ISI-V-2693-01 NL



```
001050 REM PLOWBACK,PG,WARCOLLEGE,04,04+,05,06,DOP4,DOP5,DOP6
001060 DATA .05,.30,.50,.85,.20,.70,.60,1,1,1
001070 REM R&D, AFLOAT, OTHER (OTH MATRIX)
001080 REM 05+,05,04,03-
001090 DATA 28,28,120,189,5,6,31,75                    /*R&D*/
001100 DATA 96,97,130,219,14,9,60,82                   /*AFLOAT*/
001110 DATA 289,289,710,634,91,91,243,312              /*OTHER*/
001120 REM LOAD CONTINUATION VECTOR
001130 FOR I = 1 TO 7
001140 READ NO(I)
001150 NEXT I
001160 FOR I = 1 TO 7
001170 READ A5O(I)
001180 NEXT I
001190 GOSUB 84
001200 REM LOAD GRADE MATRIX GO
001210 FOR I = 1 TO 15
001220 FOR J = 1 TO 12
001230 READ GO(I,J)
001240 NEXT J
001250 NEXT I
001260 REM LOAD SQUADRON MATRIX S1
001270 FOR I = 1 TO 15
001280 FOR J = 1 TO 5
001290 READ S1(I,J)
001300 NEXT J
001310 NEXT I
001320 REM LOAD ALLOCATION MATRIX A1
001330 FOR I = 1 TO 15
001340 FOR J = 1 TO 9
001350 READ A1(I,J)
001360 NEXT J
001370 NEXT I
001380 REM LOAD AUX MATRIX
001390 FOR I = 1 TO 15
001400 FOR J = 1 TO 6
001410 READ AUX(I,J)
001420 NEXT J
001430 NEXT I
001440 REM LOAD TRACOM MATRIX
001450 FOR I = 1 TO 7
001460 FOR J = 1 TO 5
001470 READ TCO(I,J)
001480 NEXT J
001490 NEXT I
001500 REM LOAD POLICY VECTOR PC
001510 FOR I = 1 TO 10
001520 READ PO(I)
001530 NEXT I
001540 REM LOAD OTH
001550 FOR I = 1 TO 3
001560 FOR J = 1 TO 3
```

```
001570 READ OTH (I,J)
001580 NEXT J
001590 NEXT I
001600 DATA"FLEET TOURS"
001610 DATA"FLEET READINESS SQUADRON"
001620 DATA"TRAINING COMMAND"
001630 DATA"R&D COMMUNITY"
001640 DATA"AFLOAT ASSIGNMENTS"
001650 DATA"PROFESSIONAL EDUCATION"
001660 DATA"OTHER"
001670 DATA"UNASSIGNED"
001680 DATA"NON-AVIATION ASSIGNMENTS"
001690 FOR I = 1 TO 9
001700 READ LABEL$(I)
001710 NEXT I
001720 DATA"LIGHT ATTACK"
001730 DATA"FIGHTER"
001740 DATA"MEDIUM ATTACK"
001750 DATA"EARLY WARNING"
001760 DATA"ELECTRONIC WARFARE"
001770 DATA"CARRIER BASED ASW"
001780 DATA"HELICOPTER ASW"
001790 DATA"MARITIME PATROL"
001800 DATA"LAMPS MK I"
001810 DATA"LAMPS MK III"
001820 DATA"ELECTRONIC WARFARE - VQ"
001830 DATA"FORCE SUPPORT - JET"
001840 DATA"FORCE SUPPORT - PROP"
001850 DATA"FORCE SUPPORT - HELO"
001860 FOR K = 1 TO 14
001870 READ TYPES(K)
001880 NEXT K
001890 DATA"STRIKE"
001900 DATA"MARITIME PATROL"
001910 DATA"HELICOPTER"
001920 DATA"RADAR INTERCEPT OFFICER"
001930 DATA"TACTICAL NAVIGATOR"
001940 DATA"ATDS"
001950 DATA"NAVIGATOR"
001960 FOR K = 1 TO 7
001970 READ TRA$(K)
001980 NEXT K
001990 DATA"FIRST FLEET ITERATION COMPLETE"
002000 DATA"FIRST TOUR FILL-UP COMPLETE"
002010 DATA"CATEGORY SEARCH COMPLETE"
002020 DATA"NFEA'S CREATED"
002030 DATA"FIRST TOUR LENGTH ADJUSTED"
002040 FOR K = 1 TO 5
002050 READ POSIT$(K)
002060 NEXT K
002070 ************************************************************
002080 *                                                          *
```

```
002090 *          AT THIS POINT ALL STANDARD DATA IS LOADED. AN          *
002100 *          INTERACTIVE ROUTINE TO ENTER CHANGES FOLLOWS.          *
002110 *                                                                 *
002120 *                                                                 *
002130 *******************************************************************
002140 M = 1:Q11 = 1
002150 A$ = "NAVAL AVIATORS"
002160 REM LOAD T9S WITH TOUR LENGTH AND BARRED TOURS
002170 DATA"36000NNNNNNNNNNNNNNNNN000"                    /*FLEET 1*/
002180 DATA"36NNNNNN000NNNNNNNNNNN000"                    /*FLEET 2*/
002190 DATA"36NNN0000000000NNN0000C0000"                  /*FLEET 3*/
002200 DATA"36NNN0000000000000000000000"                  /*FLEET 4*/
002210 DATA"36NNN0000000000000C00000000"                  /*FLEET 5*/
002220 DATA"240000C000000000C000000C0000"                 /*FLEET 6*/
002230 DATA"120000C0000000000C00000000"                   /*FLEET 7*/
002240 DATA"00NNNNNNNNNNNNNNNNNNN000"                     /*FRS 1  */
002250 DATA"36000NNNNNNNNNNNNNNNNN000"                    /*FRS 2  */
002260 DATA"36000NNNNNNNNNNNNNNNNN000"                    /*FRS 3  */
002270 DATA"36000NNNNNNNNNNNNNNNNN000"                    /*FRS 4  */
002280 DATA"36000NNNNNNNNNNNNNNNNN000"                    /*FRS 5  */
002290 DATA"24000NNNNNN0000000000C0000"                   /*FRS 6  */
002300 DATA"24000NNNNNNNNNNNNNNNNN000"                    /*FRS 7  */
002310 DATA"24000NNNNNNNNNNNNNNNNN000"                    /*TRAC 1 */
002320 DATA"36000NNNNNNNNNNNNNNNNN000"                    /*TRAC 2 */
002330 DATA"36NNNNNNNNNNNNNNN0000C0000"                   /*TRAC 3 */
002340 DATA"36000NNNNNNNNN0000C0C0C0000"                  /*TRAC 4 */
002350 DATA"36000NNNNNNNNN0000000000000"                  /*TRAC 5 */
002360 DATA"24000000000000000000C0000"                    /*TRAC 6 */
002370 DATA"36NNNNNN0000000000000000000"                  /*TRAC 7 */
002380 DATA"00NNNNNNNNNNNNNNNNNNN000"                     /*RD 1   */
002390 DATA"36000NNNNNNNNNNNNNNNN000"                     /*RD 2   */
002400 DATA"360000000000NNNNNNC00NNN000"                  /*RD 3   */
002410 DATA"36000000NNNNNNN0000C000C0000"                 /*RD 4   */
002420 DATA"360000000000NNN000C000000000"                 /*RD 5   */
002430 DATA"360000000000NNN0000000000000"                 /*RD 6   */
002440 DATA"360000000000NNN0000000C0000"                  /*RD 7   */
002450 DATA"00NNNNNNNNNNNNNNNNNNN000"                     /*AFLT 1 */
002460 DATA"00NNNNNNNNNNNNNNNNNNN000"                     /*AFLT 2 */
002470 DATA"24NNN0000000C0NNN0000C0000"                   /*AFLT 3 */
002480 DATA"24NNN0000000C0NNN0000C0000"                   /*AFLT 4 */
002490 DATA"24NNN0000000C000NNN0000C0000"                 /*AFLT 5 */
002500 DATA"24NNN0000000C000NNN0000C0000"                 /*AFLT 6 */
002510 DATA"240000000000000NNN000000000"                  /*AFLT 7 */
002520 DATA"00NNNNNNNNNNNNNNNNNNN000"                     /*PROF 1 */
002530 DATA"24000NNNNNNNNNNNNNNNN000"                     /*PROF 2 */
002540 DATA"2400000000000CNNNNNNC0000"                    /*PROF 3 */
002550 DATA"240000000NNNC00000NNNC0000"                   /*PROF 4 */
002560 DATA"120000000000000000NNN000000"                  /*PROF 5 */
002570 DATA"120000000000000000NNN000000"                  /*PROF 6 */
002580 DATA"1200000000000C000NNNC0000"                    /*PROF 7 */
002590 DATA"00NNNNNNNNNNNNNNNNNNN000"                     /*OTH 1  */
002600 DATA"36000NNNNNNNNNNNNNNNN000"                     /*OTH 2  */
```

```
002610 DATA"360000000000000NNNNNNNNNOOO"                          /*OTH 3  */
002620 DATA"360000000000000NNNNNNNNNOOO"                          /*OTH 4  */
002630 DATA"360000000000000NNNOOONNNOOO"                          /*OTH 5  */
002640 DATA"360000000000000000000NNNOOO"                          /*OTH 6  */
002650 DATA"360000000000000000000NNNOOO"                          /*OTH 7  */
002660 REM LOAD T9$
002670 FOR I = 1 TO 7
002680 FOR J = 1 TO 7
002690 READ T9$(I,J)
002700 T10$(I,J) = T9$(I,J)
002710 N9$(I,J) = HEX(6F)
002720 NEXT J
002730 NEXT I
002740 JMP5000:I50 = 1:I51 = 0
002750 JMP5001:ACCEPT AT(3,10),"*****************************************!
002760 **********************",                                          !
002770        AT(4,10),"*",AT(4,70),"*",                                 !
002780        AT(5,10),"*",AT(5,22),"AVIATION OFFICER REQUIREMENTS MODEL!
002790 ",AT(5,70),"*",                                                  !
002800        AT(6,10),"*",AT(6,70),"*",                                 !
002810        AT(7,10),"*****************************************************!
002820 *************",                                                  !
002830         AT(9,10),"THE AVIATION OFFICER REQUIREMENTS MODEL DETERMI!
002840 NES THE",                                                        !
002850        AT(10,10),"NUMBER OF NAVAL AVIATORS OR NAVAL FLIGHT OFFICE!
002860 RS REQUIRED",                                                    !
002870        AT(11,10),"IN RESPONSE TO THE SPECIFICATION OF OFFICER RET!
002880 ENTION AND",                                                     !
002890        AT(12,10),"A NUMBER OF FORCE LEVEL AND CAREER PLANNING PAR!
002900 AMETERS",                                                        !
002910        AT(14,10),"THE MODEL TREATS NAVAL AVIATORS AND NAVAL FLIGH!
002920 T OFFICERS",                                                     !
002930        AT(15,10),"SEPARATELY, AND BY COMMUNITY.  IT IS PRESENTLY !
002940 SET TO WORK",                                                    !
002950        AT(16,10),"ON",AT(16,13),FAC(HEX(94)),A$,AT(16,14+LEN(A$))!
002960 ,"IN THE",AT(16,21+LEN(A$)),FAC(HEX(94)),TYPES(Q11),             !
002970        AT(16,22+LEN(A$)+LEN(TYPES(Q11))),"COMMUNITY",            !
002980        AT(19,10),"TO CONTINUE WORKING IN THIS COMMUNITY PRESS  - !
002990  'ENTER'",                                                       !
003000        AT(20,10),"TO BEGIN A NEW COMMUNITY OF AVIATORS  PRESS  - !
003010     PF-1",                                                      !
003020        AT(21,10),"TO BEGIN A NEW COMMUNITY OF NFO'S     PRESS  - !
003030     PF-2",                                                      !
003040        AT(24,10),"TO END PROCESSING                     PRESS  - !
003050     PF-16",                                                     !
003060 KEYS(&IN(0)&&IN(1)&&IN(2)&&IN(16)),ON(&IN(0)&&IN(1)&&IN(2)&&IN(16!
003070 )) GOTO JMP5011,JMP5002,JMP5003,JMP5004
003080 JMP5004:END
003090 JMP5002:/*NAVAL AVIATOR DISPLAY*/
003100 ACCEPT AT(3,22),"NAVAL AVIATOR COMMUNITY SELECTIONS",             !
003110        AT(5,10),"YOU MAY SELECT FROM AMONG FOURTEEN COMMUNITIES I!
003120 N WHICH",                                                        !
```

```
003130          AT(6,10),"NAVAL AVIATORS ARE REQUIRED.  THESE ARE LISTED B!
003140 ELOW.  BY",                                                        !
003150          AT(7,10),"PRESSING THE PF KEY CORRESPONDING TO THE ITEM NU!
003160 MBER ON",                                                          !
003170          AT(8,10),"THE LIST YOU WILL SELECT NAVAL AVIATORS IN THAT !
003180 COMMUNITY",                                                        !
003190          AT(9,10),"FOR ANALYSIS.",                                !
003200          AT(11,5),"PF KEY",AT(11,14),"COMMUNITY",AT(11,45),"PF KEY"!
003210 ,AT(11,54),"COMMUNITY",                                            !
003220          AT(13,8),"1",AT(13,12),"LIGHT ATTACK",AT(13,48),"8",AT(13,!
003230 52),"MARITIME PATROL",                                             !
003240          AT(14,8),"2",AT(14,12),"FIGHTER",AT(14,48),"9",AT(14,52),"!
003250 LAMPS MK I",                                                       !
003260          AT(15,8),"3",AT(15,12),"MEDIUM ATTACK",AT(15,47),"10",   !
003270 AT(15,52),"LAMPS MK III",                                          !
003280          AT(16,8),"4",AT(16,12),"EARLY WARNING - VAW",AT(16,47),"11!
003290 ",AT(16,52),"ELECTRONIC WARFARE - VQ",                             !
003300          AT(17,8),"5",AT(17,12),"ELECTRONIC WARFARE - VAQ",AT(17,47!
003310 ),"12",AT(17,52),"FORCE SUPPORT - JET",                            !
003320          AT(18,8),"6",AT(18,12),"CARRIER BASED ASW",AT(18,47),"13",!
003330 AT(18,52),"FORCE SUPPORT - PROP",                                  !
003340          AT(19,8),"7",AT(19,12),"HELICOPTER ASW",AT(19,47),"14",AT(!
003350 19,52),"FORCE SUPPORT - HELO",                                     !
003360          AT(23,10),"TO RETURN TO BASIC MENU WITHOUT MAKING A SELECT!
003370 ION  -  PRESS 'ENTER'",                                            !
003380 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(5)&BIN(6)&BIN(7)&BIN(!
003390 8)&BIN(9)&BIN(10)&BIN(11)&BIN(12)&BIN(13)&BIN(14)),KEY(M5),        !
003400 ON BIN(0) GOTO JMP5001
003410 IF M5 = 0 THEN JMP5001
003420 M = M5
003430 G11 = M
003440 GOTO JMP5011
003450 JMP5003:/*NFO COMMUNITY DISPLAY*/
003460 ACCEPT AT(3,20),"NAVAL FLIGHT OFFICER COMMUNITY SELECTIONS",       !
003470          AT(5,10),"YOU MAY SELECT FROM AMONG NINE COMMUNITIES IN WH!
003480 ICH",                                                              !
003490          AT(6,10),"NAVAL FLIGHT OFFICERS ARE REQUIRED.  THESE ARE L!
003500 ISTED",                                                            !
003510          AT(7,10),"BELOW.  BY PRESSING THE PF KEY CORRESPONDING TO !
003520 THE",                                                              !
003530          AT(8,10),"ITEM NUMBER ON THE LIST YOU WILL SELECT NFO'S IN!
003540  THAT",                                                           !
003550          AT(9,10),"COMMUNITY FOR ANALYSIS",                       !
003560          AT(11,22),"PF KEY",AT(11,36),"COMMUNITY",                !
003570          AT(13,25),"1",AT(13,29),"FIGHTER",                       !
003580          AT(14,25),"2",AT(14,29),"MEDIUM ATTACK",                 !
003590          AT(15,25),"3",AT(15,29),"EARLY WARNING - VAW",           !
003600          AT(16,25),"4",AT(16,29),"ELECTRONIC WARFARE - VAQ",      !
003610          AT(17,25),"5",AT(17,29),"CARRIER BASED ASW",             !
003620          AT(13,25),"6",AT(13,29),"MARITIME PATROL",               !
003630          AT(19,25),"7",AT(19,29),"ELECTRONIC WARFARE - VQ",       !
003640          AT(20,25),"8",AT(20,29),"FORCE SUPPORT - JET",           !
```

```
003650         AT(21,25),"9",AT(21,29),"FORCE SUPPORT - PROP",                !
003660         AT(23,10),"TO RETURN TO BASIC MENU WITHOUT MAKING A SELECT!
003670 ION  -  PRESS 'ENTER'",                                                !
003680 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(5)&BIN(6)&BIN(7)&BIN(!
003690 8)&BIN(9)),KEY(M5),ON BIN(0) GOTO JMP5001
003700 IF M5 = 0 THEN JMP5001
003710 ON M5 GOTO ,,,,,JMP5006,JMP5007,JMP5007,JMP5007
003720 M = M5 + 16
003730 Q11 = M - 15
003740 GOTO JMP5011
003750 JMP5006:M = M5 + 17
003760 Q11 = M - 15
003770 GOTO JMP5011
003780 JMP5007:M = M5 + 19
003790 Q11 = M - 15
003800 JMP5011:FOR I = 1 TO 7
003810 FOR J = 1 TO 4
003820 DO(I,J) = 0
003830 NEXT J
003840 NEXT I
003850 REM BEGIN FILLING DO WITH REQUIREMENTS
003860 REM FLEET REQUIREMENTS
003870 FOR I = 1 TO 9
003880 FOR J = 1 TO 31
003890 INVT(8,I) = 0
003900 NEXT J
003910 NEXT I
003920 FOR I = 1 TO 7
003930 FOR J = 1 TO 7
003940 I4(I,J) = 0
003950 NEXT J
003960 NEXT I
003970 OAT = 24
003980 IF M > 15 THEN JMP312
003990 A$ = "NAVAL AVIATORS"
004000 NFEA = 0
004010 GOTO JMP313
004020 JMP312:A$ = "NAVAL FLIGHT OFFICERS"
004030 JMP313:P5 = LEN(A$)
004040 P6 = LEN(TYPE$(Q11))
004050 P7 = INT((59 - (11+P5))/2)
004060 P8 = INT((59 - (10+P6))/2)
004070 Z1$ = "YES":Z2$ = "YES":Z3$ = "YES"
004080 INIT(HEX(20))P1$(1)
004090 STR(P1$(1),1,10) = "WORKING ON"
004100 STR(P1$(1),12,LEN(A$)) = A$
004110 INIT(HEX(20))P1$(2)
004120 STR(P1$(2),1,LEN(TYPE$(Q11))) = TYPE$(Q11)
004130 STR(P1$(2),LEN(TYPE$(Q11))+2,9) = "COMMUNITY"
004140 ACCEPT AT(5,10),"**********************************************!
004150 **********",AT(6,10),"*",AT(6,70),"*",                              !
004160 AT(7,10),"*",AT(7,10+P7),FAC(HEX(3C)),P1$(1),CH(33),                  !
```

```
004170 AT(7,70),"*",AT(8,10),"*",AT(8,70),"*",AT(9,10),                    !
004180 "*",AT(9,39),"IN",AT(9,70),"*",AT(10,10),"*",AT(10,70),"*",         !
004190 AT(11,10),"*",AT(11,10+P8),FAC(HEX(8C)),P1$(2),CH(33),               !
004200 AT(11,70),"*",AT(12,10),"*                                          !
004210                          *",AT(13,10),"*********************************!
004220 *********************************",AT(16,10),                        !
004230 "DO YOU DESIRE IN-PROCESS MONITORING?",AT(16,55),FAC(HEX(81)),       !
004240 Z1$,CH(3),AT(16,61),"(YES/NO)",AT(18,10),"DO YOU DESIRE VARIABLE     !
004250 LENGTH FIRST TOUR?",AT(18,55),FAC(HEX(81)),Z2$,CH(3),AT(18,61),      !
004260 "(YES/NO)",AT(20,10),"DO YOU DESIRE UPWARD DETAILING?",AT(20,55),    !
004270 FAC(HEX(81)),Z3$,CH(3),AT(20,61),"(YES/NO)",AT(24,10),"PRESS ENTE    !
004280 R TO CONTINUE"
004290 A = R02*100:D2 = ROUND(A,0):A = D2
004300 JMP602:ACCEPT AT(5,10),"THE AVIATION OFFICER REQUIREMENTS MODEL I    !
004310 S LOADED WITH", AT(6,10),"NOMINAL VALUES OF PARAMETERS REQUIRED T    !
004320 O DETERMINE THE", AT(7,10),"REQUIREMENT FOR",AT(7,26),FAC(HEX(94)    !
004330 ),A$,CH(21),AT(7,27+P5),"IN THE",AT(7,34+P5),FAC(HEX(94)),           !
004340 TYPE$(Q11),CH(23),AT(8,10),"COMMUNITY",                              !
004350 AT(10,10),"YOU CAN REVIEW AND/OR ALTER THESE PARAMETERS BY PRESSI    !
004360 NG THE",AT(11,10),   "PF KEY CORRESPONDING TO THE ITEM NUMBERS IN    !
004370  THE LIST OF",AT(12,10),"PARAMETER CATEGORIES GIVEN BELOW.  THIS     !
004380 ACTION WILL CALL UP",AT(13,10),  "A LIST OF THE INDICATED PARAMET    !
004390 ERS WITH THEIR CURRENT VALUES",                                      !
004400         AT(15,20),"PF KEY",AT(15,30),"PARAMETER CATEGORY",          !
004410         AT(16,23),"1",AT(16,28),"BASIC COMMUNITY DATA",             !
004420         AT(17,23),"2",AT(17,28),"TRAINING REQUIREMENTS DATA",       !
004430         AT(18,23),"3",AT(18,28),"POLICY VARIABLES",                 !
004440         AT(19,23),"4",AT(19,28),"ALLOCATION PARAMETERS",            !
004450         AT(20,23),"5",AT(20,28),"CAREER PATH NETWORK",              !
004460         AT(23,10),"TO RETURN TO COMMUNITY SELECTION MENU PRESS 'PF  !
004470 -16'",                                                              !
004480         AT(24,10),"TO CONTINUE PROGRAM WITHOUT PARAMETER REVIEW PR  !
004490 ESS 'ENTER'",                                                       !
004500 KEY$(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(5)&BIN(16)),            !
004510 ON (BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(5)&BIN(16)) GOTO         !
004520 JMP591,JMP592,JMP593,JMP594,JMP595,JMP597,JMP596
004530 JMP596:GOTO JMP5001
004540 JMP592:/*BASIC DATA DISPLAY*/
004550 S = 0:S1 = 0
004560 IF Q11 = M THEN JMP601
004570 S = 1:S1 = 3
004580 JMP601:S = S+4:S1 = S1+1
004590 ACCEPT AT(5,30),"BASIC COMMUNITY DATA",                              !
004600         AT(6,INT((79-(P5+P6+1))/2)),FAC(HEX(94)),TYPE$(Q11),CH(23)  !
004610        ,AT(6,P6+1+INT((79-(P5+P6+1))/2)),FAC(HEX(94)),A$,CH(21),    !
004620         AT(9,28),"PARAMETER",AT(9,45),"CURRENT VALUE",              !
004630         AT(10,15),"NUMBER OF SQUADRONS",AT(10,50),S1(Q11,1),        !
004640                   PIC(##),                                          !
004650         AT(11,15),"AIRCRAFT PER SQUADRON",AT(11,50),S1(Q11,2),      !
004660                   PIC(##),                                          !
004670         AT(12,15),"CREW FACTOR",AT(12,51),S1(Q11,3),PIC(#.##),      !
004680         AT(13,15),FAC(HEX(8C)),A$,CH(21),AT(13,16+P5),"PER CREW",   !
```

```
004690          AT(13,51),S1(Q11,S),PIC(#.##),                          !
004700          AT(14,10),"*************************************************!
004710 **************",                                                  !
004720          AT(15,15),"SQUADRON GRADE DISTRIBUTION",                !
004730          AT(16,20),"COMMANDERS",AT(16,50),GO(Q11,S1),PIC(##),    !
004740          AT(17,20),"LT. COMMANDERS",AT(17,50),GO(Q11,S1+1),PIC(##),!
004750          AT(18,20),"LIEUTENANTS",AT(18,50),GO(Q11,S1+2),PIC(##),  !
004760          AT(19,10),"*************************************************!
004770 **************",                                                  !
004780          AT(20,15),"NON-AVIATION TOUR LENGTH",AT(20,50),OAT,PIC(##)!
004790         ,AT(21,15),"COMMUNITY RETENTION",AT(21,50),D2,PIC(##),    !
004800          AT(21,53),"PER CENT",                                   !
004810          AT(22,10),"*************************************************!
004820 **************",                                                  !
004830          AT(23,10),"PRESS PF-1 TO RETURN TO CATEGORY MENU WITHOUT E!
004840 NTERING CHANGES",                                                 !
004850          AT(24,10),"PRESS ENTER TO RECORD CHANGES AND CONTINUE",  !
004860 KEYS(&IN(0)&IN(1)),                                               !
004870 ON IN(1) GOTO JMP602
004880 GOTO JMP602
004890 JMP593:/*TRAINING REQUIREMENTS DISPLAY*/
004900 S = 0:S1 = 0
004910 IF Q11 = M THEN JMP603
004920 S = 3:S1 = 1
004930 JMP603:S = S+7:S1 = S1+1
004940 ACCEPT AT(5,27),"TRAINING REQUIREMENTS DATA",                     !
004950          AT(6,INT((79-(P5+P6+1))/2)),FAC(HEX(94)),TYPE$(Q11),CH(23)!
004960         ,AT(6,P6+1+INT((79-(P5+P6+1))/2)),FAC(HEX(94)),A$,CH(21),!
004970          AT(9,10),"*************************************************!
004980 **************",                                                  !
004990          AT(10,10),"FLEET READINESS SQUADRONS (AGGREGATE REQUIREMEN!
005000 TS)",                                                             !
005010          AT(11,20),"COMMANDERS",AT(11,53),GO(Q11,S),PIC(##),      !
005020          AT(12,20),"LT. COMMANDERS",AT(12,53),GO(Q11,S+1),PIC(##),!
005030          AT(13,20),"LIEUTENANTS",AT(13,52),GO(Q11,S+2),PIC(###),  !
005040          AT(14,10),"*************************************************!
005050 **************",                                                  !
005060          AT(15,10),"UNDERGRADUATE TRAINING -",AT(15,37),          !
005070                    FAC(HEX(8C)),TRA$(A1(Q11,S1)),CH(23),          !
005080                    AT(15,38+LEN(TRA$(A1(Q11,S1)))),               !
005090                    "TRAINING PIPELINE",                           !
005100          AT(16,20),"COMMANDERS",AT(16,53),TCO(A1(Q11,S1),2),PIC(##)!
005110 ,AT(17,20),"LT. COMMANDERS",AT(17,53),TCO(A1(Q11,S1),3),PIC(##),  !
005120          AT(18,20),"INSTRUCTOR PILOTS PER GRADUATE",AT(18,54),    !
005130                    TCO(A1(Q11,S1),4),PIC(#.###),                  !
005140          AT(19,20),"INSTRUCTOR NFOS PER GRADUATE",AT(19,54),      !
005150                    TCO(A1(Q11,S1),5),PIC(#.###),                  !
005160          AT(20,10),"*************************************************!
005170 **************",                                                  !
005180          AT(23,10),"PRESS PF-1 TO RETURN TO CATEGORY MENU WITHOUT E!
005190 NTERING CHANGES",                                                 !
005200          AT(24,10),"PRESS ENTER TO RECORD CHANGES AND CONTINUE",  !
```

```
005210 KEYS(BIN(0)&BIN(1)),                                                    !
005220 ON BIN(1) GOTO JMP602
005230 GOTO JMP602
005240 JMP594:/*POLICY VARIABLES*/
005250 ACCEPT AT(5,32),"POLICY VARIABLES",                                      !
005260        AT(6,INT((79-(P5+P6+1))/2)),FAC(HEX(94)),TYPE$(Q11),CH(23)!
005270       ,AT(6,P6+1+INT((79-(P5+P6+1))/2)),FAC(HEX(94)),A$,CH(21),       !
005280        AT(15,10),"FLOWBACK INSTRUCTORS (FRACTION OF GRADUATES)",       !
005290        AT(15,60),P0(1),PIC(#.##),                                      !
005300        AT(17,10),"POSTGRADUATE FLOW (FRACTION OF 12 YEAR COHORT)"!
005310 ,AT(17,60),P0(2),PIC(#.##),                                            !
005320        AT(19,10),"WAR COLLEGE FLOW (FRACTION OF 18 YEAR COHORT)",!
005330                  AT(19,60),P0(3),PIC(#.##),                            !
005340        AT(21,10),"*************************************************!
005350 ************",                                                         !
005360        AT(23,10),"PRESS PF-1 TO RETURN TO CATEGORY MENU WITHOUT E!
005370 NTERING CHANGES",                                                      !
005380        AT(24,10),"PRESS ENTER TO RECORD CHANGES AND CONTINUE",         !
005390 KEYS(BIN(0)&BIN(1)),                                                    !
005400 ON BIN(1) GOTO JMP602
005410 GOTO JMP602
005420 JMP595:/*ALLOCATION PARAMETERS)*/
005430 S1 = 0:S = 0
005440 IF M = Q11 THEN JMP604
005450 S1 = 3:S = 1
005460 JMP604:S1 = S1+3:S = S+1
005470 ACCEPT AT(5,30),"ALLOCATION PARAMETERS",                                 !
005480        AT(6,INT((79-(P5+P6+1))/2)),FAC(HEX(94)),TYPE$(Q11),CH(23)!
005490       ,AT(6,P6+1+INT((79-(P5+P6+1))/2)),FAC(HEX(94)),A$,CH(21),       !
005500        AT(12,10),"FRACTION OF ALL",AT(12,26),FAC(HEX(8C)),A$,          !
005510                  CH(23),AT(12,65),A1(Q11,S1),PIC(#.####),              !
005520        AT(14,10),"FRACTION OF",AT(14,22),FAC(HEX(8C)),                 !
005530                  TRA$(A1(Q11,S)),CH(23),AT(14,23+LEN(TRA$(A1(Q11!
005540 ,S)))),FAC(HEX(8C)),A$,CH(21),AT(14,65),A1(Q11,S1+1),PIC(#.####),!
005550        AT(16,10),"FRACTION OF CARRIER",AT(16,30),FAC(HEX(8C)),         !
005560                  A$,CH(21),AT(16,65),A1(Q11,S1+2),PIC(#.####),         !
005570        AT(18,10),"FRACTION OF ALL AVIATION OFFICERS",AT(18,65),        !
005580                  A1(Q11,9),PIC(#.####),                                !
005590        AT(21,10),"*************************************************!
005600 ***************",                                                      !
005610        AT(23,10),"PRESS PF-1 TO RETURN TO CATEGORY MENU WITHOUT E!
005620 NTERING CHANGES",                                                      !
005630        AT(24,10),"PRESS ENTER TO RECORD CHANGES AND CONTINUE",         !
005640 KEYS(BIN(0)&BIN(1)),                                                    !
005650 ON BIN(1) GOTO JMP602
005660 GOTO JMP602
005670 JMP597:/* NETWORK NODE DISPLAY */
005680 ACCEPT AT(2,10),"YOU CAN INSPECT AND/OR MODIFY THE CAREER PATH NE!
005690 TWORK CHARACTERISTICS",                                                !
005700        AT(3,10),"ASSOCIATED WITH ANY NODE IN THE NETWORK.  TO SEL!
005710 ECT A PARTICULAR NODE",                                                !
005720        AT(4,10),"REPLACE THE 'O' IN THE DIAGRAM BELOW WITH AN 'X'!
```

```
005730 .  TO BYPASS A NODE",                                                    !
005740          AT(5,10),"PRESS 'TAE'.",                                        !
005750          AT(7,49),"TOUR NUMBER",                                         !
005760          AT(9,23),"ACTIVITY",AT(9,42),"1   2   3   4   5   6   7",      !
005770          AT(11,15),FAC(HEX(8C)),LABEL$(1),AT(11,42),FAC(HEX(83)),        !
005780                N9$(1,1),AT(11,46),FAC(HEX(38)),N9$(1,2),AT(11,50),       !
005790                  FAC(HEX(88)),N9$(1,3),AT(11,54),FAC(HEX(88)),           !
005800                N9$(1,4),AT(11,58),FAC(HEX(88)),N9$(1,5),AT(11,62),       !
005810                  FAC(HEX(88)),N9$(1,6),AT(11,66),FAC(HEX(83)),           !
005820                  N9$(1,7),                                               !
005830          AT(12,15),FAC(HEX(8C)),LABEL$(2),AT(12,42),FAC(HEX(88)),        !
005840                  N9$(2,1),AT(12,46),FAC(HEX(88)),N9$(2,2),               !
005850                  AT(12,50),FAC(HEX(88)),N9$(2,3),AT(12,54),              !
005860                  FAC(HEX(83)),N9$(2,4),AT(12,58),FAC(HEX(88)),           !
005870                  N9$(2,5),AT(12,62),FAC(HEX(88)),N9$(2,6),               !
005880                  AT(12,66),FAC(HEX(88)),N9$(1,7),                        !
005890          AT(13,15),FAC(HEX(8C)),LABEL$(3),AT(13,42),FAC(HEX(83)),        !
005900                  N9$(3,1),AT(13,46),FAC(HEX(88)),N9$(3,2),               !
005910                  AT(13,50),FAC(HEX(88)),N9$(3,3),AT(13,54),              !
005920                  FAC(HEX(88)),N9$(3,4),AT(13,58),FAC(HEX(88)),           !
005930                  N9$(3,5),AT(13,62),FAC(HEX(88)),N9$(3,6),               !
005940                  AT(13,66),FAC(HEX(88)),N9$(3,7),                        !
005950          AT(14,15),FAC(HEX(8C)),LABEL$(4),AT(14,42),FAC(HEX(88)),        !
005960                  N9$(4,1),AT(14,46),FAC(HEX(88)),N9$(4,2),               !
005970                  AT(14,50),FAC(HEX(88)),N9$(4,3),AT(14,54),              !
005980                  FAC(HEX(83)),N9$(4,4),AT(14,58),FAC(HEX(88)),           !
005990                  N9$(4,5),AT(14,62),FAC(HEX(88)),N9$(4,6),               !
006000                  AT(14,66),FAC(HEX(83)),N9$(4,7),                        !
006010          AT(15,15),FAC(HEX(8C)),LABEL$(5),AT(15,42),FAC(HEX(83)),        !
006020                  N9$(5,1),AT(15,46),FAC(HEX(88)),N9$(5,2),               !
006030                  AT(15,50),FAC(HEX(88)),N9$(5,3),AT(15,54),              !
006040                  FAC(HEX(88)),N9$(5,4),AT(15,58),FAC(HEX(83)),           !
006050                  N9$(5,5),AT(15,62),FAC(HEX(88)),N9$(5,6),               !
006060                  AT(15,66),FAC(HEX(88)),N9$(5,7),                        !
006070          AT(16,15),FAC(HEX(8C)),LABEL$(6),AT(16,42),FAC(HEX(83)),        !
006080                  N9$(6,1),AT(16,46),FAC(HEX(88)),N9$(6,2),               !
006090                  AT(16,50),FAC(HEX(88)),N9$(6,3),AT(16,54),              !
006100                  FAC(HEX(83)),N9$(6,4),AT(16,58),FAC(HEX(88)),           !
006110                  N9$(6,5),AT(16,62),FAC(HEX(88)),N9$(6,6),               !
006120                  AT(16,66),FAC(HEX(83)),N9$(6,7),                        !
006130          AT(17,15),FAC(HEX(8C)),LABEL$(7),AT(17,42),FAC(HEX(88)),        !
006140                  N9$(7,1),AT(17,46),FAC(HEX(88)),N9$(7,2),               !
006150                  AT(17,50),FAC(HEX(88)),N9$(7,3),AT(17,54),              !
006160                  FAC(HEX(83)),N9$(7,4),AT(17,58),FAC(HEX(83)),           !
006170                  N9$(7,5),AT(17,62),FAC(HEX(88)),N9$(7,6),               !
006180                  AT(17,66),FAC(HEX(88)),N9$(7,7),                        !
006190                  AT(23,10),"TO BEGIN NODE INSPECTION/MODIFICATION         !
006200 PRESS       'ENTER'",                                                    !
006210                  AT(24,10),"TO RETURN TO CATEGORY MENU PRESS              !
006220            'PF-1'",                                                      !
006230 KEYS(HEX(0001)),ON(SIN(1)) GOTO JMP602
006240 FOR I = 1 TO 7
```

```
006250 FOR J = 1 TO 7
006260 IF N9$(I,J) = HEX(6F) THEN JMP599
006270 ACCEPT AT(1,30),"NODE CHARACTERISTICS",                          !
006280        AT(3,10),"NODE CHARACTERISTICS ARE REFERRED TO THE OUTPUT !
006290 END OF THE ARC",                                                 !
006300        AT(4,10),"IN QUESTION.  THAT NODE IDENTIFIES THE ACTIVITY !
006310 IN WHICH THE",                                                   !
006320        AT(5,10),"OFFICER IS ENGAGED.  THE ACTIVITY AND TOUR NUMBE!
006330 R CURRENTLY",                                                    !
006340        AT(6,10),"BEING EXAMINED IS:",                           !
006350        AT(8,15),FAC(HEX(8C)),LABEL$(1),AT(8,42),"TOUR NUMBER",  !
006360        AT(8,55),FAC(HEX(8C)),J,PIC(#),                          !
006370        AT(10,10),"FOR TOURS TERMINATING AT THAT NODE",          !
006380        AT(11,10),"THE FOLLOWING VALUES APPLY:",                 !
006390        AT(13,34),"TOUR LENGTH",AT(13,50),FAC(HEX(89)),S [illegible](T9$(I,J!
006400 ),1,2),                                                          !
006410        AT(15,10),"PRECEDENT NODE        STATE",AT(15,5  "PRECEDE!
006420 NT NODE        STATE",                                          !
006430        AT(16,5),FAC(HEX(8C)),LABEL$(1),AT(16,33),FAC(H  89)),   !
006440                 STR(T9$(I,J),3,3),AT(16,45),FAC(HEX(8C  BEL$(2!
006450 ),AT(16,73),FAC(HEX(89)),STR(T9$(I,J),6,3),                     !
006460        AT(17,5),FAC(HEX(8C)),LABEL$(3),AT(17,33),FAC(HE  89)),  !
006470                 STR(T9$(I,J),9,3),AT(17,45),FAC(HEX(8C)),LABEL$(4!
006480 ),AT(17,73),FAC(HEX(89)),STR(T9$(I,J),12,3),                    !
006490        AT(18,5),FAC(HEX(8C)),LABEL$(5),AT(18,33),FAC(HEX(89)),  !
006500                 STR(T9$(I,J),15,3),AT(18,45),FAC(HEX(8C)),LABEL$(
006510 6),AT(18,73),FAC(HEX(89)),STR(T9$(I,J),18,3),                   !
006520        AT(19,5),FAC(HEX(8C)),LABEL$(7),AT(19,33),FAC(HEX(89)),  !
006530                 STR(T9$(I,J),21,3),                             !
006540        AT(21,20),"NOTE - 'NNN' MEANS THAT THE PRECEDENT NODE IS R!
006550 ARRED",                                                          !
006560        AT(23,5),"TO EXIT WITHOUT MAKING CHANGES PRESS 'PF-1'",   !
006570        AT(24,5),"TO ENTER CHANGES PRESS              'ENTER'",   !
006580 KEYS(HEX(0001)),ON (BIN(1)) GOTO JMP599
006590 JMP599:NEXT J
006600 NEXT I
006610 GOTO JMP602
006620 JMP591:IF A = D2 THEN JMP606
006630 R02 = D2/100
006640 ACCEPT AT(5,10),"YOU HAVE REQUESTED A CHANGE IN RETENTION FOR",  !
006650        AT(5,55),FAC(HEX(8C)),A$,CH(21),                         !
006660        AT(6,10),"IN THE",AT(6,17),FAC(HEX(8C)),TYPE$(Q11),CH(23),!
006670        AT(6,18+LEN(TYPE$(Q11))),"COMMUNITY",                    !
006680        AT(7,10),"THIS WILL CAUSE A CHANGE IN THE CONTINUATION VEC!
006690 TOR.  THE FOUR",                                                 !
006700        AT(8,10),"PARAMETERS WHICH DEFINE THIS VECTOR ARE DISPLAYE!
006710 D BELOW FOR",                                                    !
006720        AT(9,10),"REVIEW AND/OR CHANGE",                         !
006730        AT(12,10),"RETENTION",AT(12,45),D2,PIC(##),AT(12,48),    !
006740                  "PER CENT",                                    !
006750        AT(14,10),"MINIMUM SERVICE REQUIREMENT",AT(14,45),R03,   !
006760                  PIC(##),AT(14,48),"YEARS",                     !
```

```
006770         AT(16,10),"RETENTION POINT",AT(16,45),R04,PIC(##),          !
006780         AT(16,48),"YEARS",                                          !
006790         AT(13,10),"CAREER STABLE POINT",AT(13,45),R05,PIC(##),      !
006800         AT(18,48),"YEARS",                                          !
006810         AT(21,10),"**********************************************!
006820 **********",                                                        !
006830         AT(23,10),"PRESS PF-1 TO CONTINUE WITHOUT CHANGING THE CON!
006840 TINUATION VECTOR",                                                  !
006850         AT(24,10),"PRESS ENTER TO MAKE CONTINUATION VECTOR CHANGES!
006860 ",                                                                  !
006870 KEYS(BIN(0)&BIN(1)),                                                !
006880 ON BIN(1) GOTO JMP612
006890 IF A = D2 THEN JMP606
006900 R02 = D2/100
006910 GOSUB' 64(R02,R03,R04,R05)
006920 A = R02*100
006930 JMP612:R02 = A/100
006940 JMP606:GOSUB' 63
006950 ************************************************************
006960 *                                                          *
006970 *       MODIFICATION OF DATA COMPLETE. BEGIN REQUIREMENTS  *
006980 *       COMPUTATION>                                       *
006990 *                                                          *
007000 ************************************************************
007010 IF M > 15 THEN NF0
007020 P = 3:N = 4:B = M
007030 IF M > 10 THEN DFILL ELSE CONT1
007040 NF0:P = 6:N = 7:B = M - 15
007050 IF M > 25 THEN DFILL
007060 CONT1:IF M > 15 THEN D1 = S1(B,5) ELSE D1 = S1(B,4)
007070 D0(1,ABS(P-N)) = (S1(B,2)*S1(B,3)*D1-G0(B,P-1)-G0(B,P-2))*S1(B,1)
007080 FOR K = P-1 TO P-2 STEP -1
007090 D0(1,ABS(K-N)) = G0(B,K)*S1(B,1)
007100 IF A1(B,5) = 0 THEN CONT2
007110 IF K = 1 THEN CONT2
007120 D0(1,ABS(K-N)) = D0(1,ABS(K-N))+G0(15,K)*S1(15,1)*A1(B,2+P)
007130 CONT2:NEXT K
007140 D0(1,4) = G0(15,P-2)*S1(15,1)*A1(B,2+P)
007150 DFILL:FOR K = P TO P-2 STEP -1
007160 D0(1,ABS(K-N)) = D0(1,ABS(K-N)) + AUX(B,K)
007170 NEXT K
007180 REM FRS REQUIREMENTS
007190 P = P + 6:N = N + 6
007200 IF G0(B,P) = 0 THEN TRACT
007210 FOR K = P TO P-2 STEP -1
007220 D0(2,ABS(K-N)) = G0(B,K)
007230 NEXT K
007240 A = 0              /*FRS BONUS BILLETS*/
007250 IF G0(B,10) > 0 THEN NNF0
007260 IF M > 5 THEN TRACT
007270 A = 2
007280 NNF0:A = A + 2
```

```
007290 IF GO(B,P-2) >= A THEN FRS1
007300 A = 1
007310 FRS1:DO(2,4) = A/2
007320 DO(2,3) = DO(2,3) - A/2
007330 TRACT:REM TRAINING COMMAND REQUIREMENTS (LESS FIRST TOUR)
007340 IF P = 12 THEN INFO
007350 DO(3,3) = TCO(A1(B,1),2)*A1(B,4)
007360 DO(3,2) = TCO(A1(B,1),3)*A1(B,4)
007370 GOTO OTHER
007380 INFO: DO(3,3) = TCO(A1(B,2),2)*A1(B,7)
007390 DO(3,2) = TCO(A1(B,2),3)*A1(B,7)
007400 OTHER:REM DO( ) 4 = R&D, 5 = AFLOAT, 7 = OTHER
007410 N = 3:A = 0
007420 P = P - 6
007430 IF P > 3 THEN ONFO
007440 A = 5 :GOTO OPIL
007450 ONFO:A = 9
007460 OPIL:FOR I = 4 TO 7
007470 IF I = 6 THEN ESCP1
007480 FOR J = 1 TO 4
007490 DO(I,J) = OTH(I-N,ABS(J-A))*A1(B,P)
007500 NEXT J
007510 GOTO OUTI
007520 ESCP1: N = N + 1
007530 OUTI:NEXT I
007540 GOSUB' 83
007550 ************************************************************
007560 *                                                          *
007570 *     DO( ) IS NOW LOADED WITH ALL VALUES EXCEPT TRACOM    *
007580 *     FIRST TOUR AND PROFESSIONAL EDUCATION.  BEGIN        *
007590 *     CALCULATION OF ENTRIES TO INVT MATRIX, INVTO IS      *
007600 *     WORKING FILE.                                        *
007610 *           INVT(8,-) = TOTAL LINE                         *
007620 *           INVT(9,-) = CUMULATIVE INVENTORY LINE          *
007630 *                                                          *
007640 ************************************************************
007650 D2 = 0
007660 FOR J = 1 TO 4
007670 FOR I = 1 TO 7
007680 D2 = D2 + DO(I,J)
007690 NEXT I
007700 NEXT J
007710 C5 = 1:RO8 = 0
007720 FOR J = 1 TO 30
007730 RO8 = RO8 + C5*(1+RO(J))
007731 C5 = C5*RO(J)
007732 NEXT J
007733 IO = (2*D2)/RO8
007734 GOSUB' 53(IO,12)
007740 FOR K = 1 TO 31
007750 INVTO(K) = INVT(8,K)
007760 NEXT K
```

```
007770 Q10 = 0
007780 FOR I = 1 TO 7
007790 Q38(I) = 0
007800 FOR J = 1 TO 4
007810 Q4(I,J) = DO(I,J)
007820 NEXT J
007830 NEXT I
007840 CONVERT STR(T9$(1,1),1,2) TO T11
007850 JMP300:REM COMPUTE TRACOM FIRST TOUR NUMBERS.
007860 L = 1
007870 IF M < 15 THEN JMP25
007880 L = L + 1
007890 JMP25:DO(3,1) = DO(3,1) + TCO(A1(Q11,L),3+L)*INVTO(31)
007900 REM COMPUTE PROFESSIONAL EDUCATION NUMBERS
007910 DO(6,1) = DO(6,1) + PO(2)*INVTO(12)*2
007920 DO(6,2) = DO(6,2) + PO(3)*INVTO(18)*.5
007930 DO(6,3) = DO(6,3) + PO(3)*INVTO(18)*.5
007940 FOR I = 1 TO 12
007950 T5(I) = 0
007960 T6(I) = 0
007970 T7(I) = 0
007980 T8(I) = 0
007990 NEXT I
008000 IF Q10 > 0 THEN JMP322
008010 FOR J = 1 TO 4
008020 D8(J) = 0
008030 FOR I = 1 TO 7
008040 D8(J) = D8(J) + DO(I,J)
008050 NEXT I
008060 NEXT J
008070 Q10 = 1
008080 JMP322:REM COMPUTE FRONT END NUMBERS
008090 CONVERT STR(T9$(3,1),1,2) TO T12
008100 D3 = (INVTO(31)*PO(1))*(RO(1)**(T11/12))
008110 D2 = D3*(1+(RO(1)**(T11/12)))*T11/24
008120 GOSUB' 55(0,T11,INVTO(31)*(1-PO(1)),1,1)
008130 IF T50 <= 1 AND C <= DO(1,1) THEN JMP881
008140 IF ABS(C-(DO(1,1)-D2)) < (INVT(3,31)/12)*.5 THEN JMP831
008150 IF Z2$ <> "YES" THEN JMP883
008160 GOSUB' 52(T12,INVT(8,31),Q4(1,1),RO(1))
008170 GOTO JMP881
008180 JMP883:GOSUB' 62(C,DO(1,1),1)
008190 JMP881:FOR K = 1 TO 12
008200 T5(K) = T5(K)
008210 NEXT K
008220 I4(1,1) = I4(1,1) + I2
008230 CONVERT STR(T9$(1,1),3,3) TO D2
008240 D2 = D2 + INT(C2+.5)
008250 CONVERT D2 TO STR(T9$(1,1),3,3),PIC(###)
008260 DO(1,1) = DO(1,1) - C
008270 P1 = I2
008280 IF PO(1) = 0 THEN JMP930
```

```
008290 GOSUB' 55(0,T12,D3,3,1)
008300 FOR K = 1 TO 12
008310 T6(K) = T3(K)
008320 NEXT K
008330 I4(3,1) = I4(3,1) + I2
008340 H3 = I2
008350 CONVERT STR(T9$(3,1),3,3) TO D2
008360 D2 = D2 + INT(C2+.5)
008370 CONVERT D2 TO STR(T9$(3,1),3,3),PIC(###)
008380 D0(3,1) = D0(3,1) - C
008390 T13 = T11
008400 GOSUB' 55(T12,T13,I2,1,2)
008410 I4(1,2) = I4(1,2) + I2
008420 P2 = I2
008430 CONVERT STR(T9$(1,2),9,3) TO D2
008440 D2 = D2 + INT(C2+.5)
008450 CONVERT D2 TO STR(T9$(1,2),9,3),PIC(###)
008460 D0(1,1) = D0(1,1) - C
008470 JMP930:FOR K = 1 TO 11
008480 INVT(1,K) = INVT(1,K) + T5(K+1)
008490 INVT(3,K) = INVT(3,K) + T6(K+1)
008500 INVT(8,K) = INVT(8,K) - T5(K+1) - T6(K+1)
008510 NEXT K
008520 FOR K = INT(T12/12 + 1) TO 11
008530 INVT(1,K) = INVT(1,K) + T8(K-INT(T12/12+1)+2)
008540 INVT(3,K) = INVT(8,K) - T8(K-INT(T12/12+1)+2)
008550 NEXT K
008560 CONVERT STR(T9$(6,2),1,2) TO T2
008570 H1 = P1
008580 P1 = (1-P0(1))*P0(2)*INVT0(12)
008590 GOSUB' 60(T11,T2,P1,2)
008600 CONVERT STR(T9$(6,2),3,3) TO B2
008610 B2 = B2 + INT(C2+.5)
008620 CONVERT B2 TO STR(T9$(6,2),3,3),PIC(###)
008630 I4(6,2) = I4(6,2) + P1
008640 H1 = H1 - K6
008650 H3 = P1
008660 H2 = P2
008670 P2 = P0(1)*P0(2)*INVT0(12)
008680 CONVERT STR(T9$(6,3),1,2) TO T2
008690 GOSUB' 60((T12+T13),T2,P2,3)
008700 CONVERT STR(T9$(6,3),3,3) TO B2
008710 B2 = B2 + INT(C2+.5)
008720 CONVERT B2 TO STR(T9$(6,3),3,3),PIC(###)
008730 I4(6,3) = I4(6,3) + P2
008740 H2 = H2 - K6
008750 GOSUB' 58(2,1)     /*DISTRIBUTE FLEET TOUR OUTPUT*/
008760 FOR K = 1 TO 7
008770 T5(K) = A2(1,K)*(H1+Q7(1,1))
008780 T6(K) = 0:T7(K) = 0
008790 NEXT K
008800 T5(8) = 0
```

```
008810 Q7(1,1) = 0
008820 FOR I = 1 TO 7
008830 CONVERT STR(T9$(I,2),1,2) TO T2
008840 IF T5(I) <= 0 THEN JMP808
008850 IF STR(T9$(I,2),3,3) = "NNN" THEN JMP808
008860 GOSUB' 55(T11,T2,T5(I),I,2)
008870 GOSUB' 61(T11,T2,T5(I),1,I,2,1)
008880 CONVERT STR(T9$(I,2),3,3) TO D2
008890 D2 = D2 + INT(C2+.5)
008900 CONVERT D2 TO STR(T9$(I,2),3,3),PIC(###)
008910 T5(I) = DLT
008920 T6(I) = I2
008930 JMP808:T5(I+1) = T5(I+1) + T5(I)
008940 NEXT I
008950 Q7(1,1) = Q7(1,1) + T5(8)
008960 IF Q7(1,1) = 0 THEN JMP661
008970 IF Z3$ <> "YES" THEN JMP2001
008980 GOSUB' 66(1,2,1)
008990 FOR K = 1 TO 7
009000 T6(K) = T6(K) + T17(K)
009010 NEXT K
009020 IF Q7(1,1) <= 0 THEN JMP661
009030 JMP2001:I2 = DAT
009040 GOSUB' 55(T11,T2,Q7(1,1),7,2)
009050 GOSUB' 61(T11,T2,Q7(1,1),1,9,2,1)
009060 Q38(1) = Q38(1) + DLT
009070 T6(7) = T6(7) + I2
009080 OUTA(2) = OUTA(2) + C
009090 JMP661:/*BEGIN FLEET FLOWBACK FLOWOUT  */
009100 GOSUB' 58(3,1)
009110 FOR K = 1 TO 7
009120 T5(K) = A2(1,K)*(H2+Q7(1,2))
009130 NEXT K
009140 T5(8) = 0
009150 Q7(1,2) = 0
009160 FOR I = 1 TO 7
009170 CONVERT STR(T9$(I,3),1,2) TO T2
009180 IF T5(I) <= 0 THEN JMP812
009190 IF STR(T9$(I,3),3,3) = "NNN" THEN JMP812
009200 GOSUB' 55((T12+T13),T2,T5(I),I,3)
009210 GOSUB' 61((T12+T13),T2,T5(I),1,I,3,1)
009220 CONVERT STR(T9$(I,3),3,3) TO D2
009230 D2 = D2 + INT(C2+.5)
009240 CONVERT D2 TO STR(T9$(I,3),3,3),PIC(###)
009250 T5(I) = DLT
009260 T7(I) = I2
009270 JMP812:T5(I+1) = T5(I+1) + T5(I)
009280 NEXT I
009290 Q7(1,2) = Q7(1,2) + T5(8)
009300 IF Q7(1,2) = 0 THEN JMP562
009310 IF Z3$ <> "YES" THEN JMP2002
009320 GOSUB' 66(1,3,1)
```

```
009330 FOR K = 1 TO 7
009340 T7(K) = T7(K) + T17(K)
009350 NEXT K
009360 IF Q7(1,2) <= 0 THEN JMP662
009370 JMP2002:T16 = DAT
009380 GOSUB' 55((T12+T13),T16,Q7(1,2),7,3)
009390 GOSUB' 61((T12+T13),T16,Q7(1,2),1,9,3,1)
009400 Q38(2) = Q38(2) + DLT
009410 T7(7) = T7(7) + I2
009420 OUTA(3) = OUTA(3) + C
009430 JMP662:/*BEGIN PG1 FLOW OUT*/
009440 GOSUB' 58(3,1)
009450 FOR K = 1 TO 7
009460 T5(K) = A2(6,K)*(H3 + Q7(6,2))
009470 NEXT K
009480 T5(8) = 0
009490 Q7(6,2) = 0
009500 FOR I = 1 TO 7
009510 CONVERT STR(T9$(I,3),1,2) TO T2
009520 CONVERT STR(T9$(6,2),1,2) TO T14
009530 IF T5(I) <= 0 THEN JMP816
009540 IF STR(T9$(I,3),18,3) = "NNN" THEN JMP816
009550 GOSUB' 55((T11+T14),T2,T5(I),I,3)
009560 GOSUB' 61((T11+T14),T2,T5(I),6,I,3,1)
009570 CONVERT STR(T9$(I,3),18,3) TO D2
009530 D2 = D2 + INT(C2+.5)
009590 CONVERT D2 TO STR(T9$(I,3),18,3),PIC(###)
009600 T5(I) = DLT
009610 T7(I) = T7(I) + I2
009620 JMP816:T5(I+1) = T5(I+1) +T5(I)
009630 NEXT I
009640 Q7(6,2) = Q7(6,2) + T5(3)
009650 T7(6) = T7(6) + P1
009660 IF Q7(6,2) = 0 THEN JMP663
009670 IF Z3$ <> "YES" THEN JMP2003
009680 GOSUB' 66(6,3,1)
009690 FOR K = 1 TO 7
009700 T7(K) = T7(K) + T17(K)
009710 NEXT K
009720 IF Q7(6,2) <= 0 THEN JMP663
009730 JMP2003:GOSUB' 55((T11+T14),T16,Q7(6,2),7,3)
009740 GOSUB' 61((T11+T14),T16,Q7(6,2),6,9,3,1)
009750 Q38(2) = Q38(2) + DLT
009760 T7(7) = T7(7) + I2
009770 OUTA(3) = OUTA(3) + C
009780 JMP663:/* BEGIN MULTI NODE LOOPS */
009790 GOSUB' 58(3,1)
009800 FOR N = 1 TO 7
009810 IF T6(N) <= 0 THEN JMP717
009820 K2 = 0
009830 FOR K = 1 TO 7
009840 T5(K) = A2(N,K)*(T6(N) + Q7(N,2))
```

```
009850 K2 = K2 + T5(K)
009860 NEXT K
009870 IF K2 > 0 THEN JMP672
009880 Q7(N,2) = T6(N)
009890 GOTO JMP673
009900 JMP672:T5(8) = 0
009910 Q7(N,2) = 0
009920 FOR I = 1 TO 7
009930 T5(I) = T5(I) + Q7(N,2)
009940 CONVERT STR(T9$(I,3),1,2) TO T2
009950 CONVERT STR(T9$(N,2),1,2) TO T14
009960 IF T5(I) <= 0 THEN JMP818
009970 IF STR(T9$(I,3),3*N,3) = "NNN" THEN JMP818
009980 GOSUB' 55((T11+T14),T2,T5(I),I,3)
009990 GOSUB' 61((T11+T14),T2,T5(I),N,I,3,1)
010000 CONVERT STR(T9$(I,3),3*N,3) TO D2
010010 D2 = D2 + INT(C2+.5)
010020 CONVERT D2 TO STR(T9$(I,3),3*N,2),PIC(###)
010030 T5(I) = DLT
010040 T7(I) = T7(I) + I2
010050 JMP818:Q7(N,2) =  T5(I)
010060 NEXT I
010070 JMP673:IF Q7(N,2) = 0 THEN JMP717
010080 IF Z3$ <> "YES" THEN JMP2004
010090 GOSUB' 66(N,3,1)
010100 FOR K = 1 TO 7
010110 T7(K) = T7(K) + T17(K)
010120 NEXT K
010130 IF Q7(N,2) <= 0 THEN JMP717
010140 JMP2004:CONVERT STR(T9$(N,2),1,2) TO T14
010150 T16 = DAT
010160 GOSUB' 55((T11+T14),T16,Q7(N,2),7,3)
010170 GOSUB' 61((T11+T14),T16,Q7(N,2),N,9,3,1)
010180 Q38(2) = Q38(2) + DLT
010190 T7(7) = T7(7) + I2
010200 OUTA(3) = OUTA(3) + C
010210 JMP717:NEXT N
010220 GOSUB' 65(3)
010230 GOSUB' 68(3,1)
010240 /* COMPLETE LOOPING ON J */
010250 IF Z1$ <> "YES" THEN JMP731
010260 C$ = "AT END TOUR THREE"
010270 STOP"END TOUR THREE - PF-14 FOR DATA"
010280 JMP731:FOR J = 4 TO 7
010290 IF J = 4 THEN S = 2 ELSE S = J-3
010300 GOSUB' 58(J,S)
010310 FOR K = 1 TO 7
010320 T6(K) = T7(K)
010330 T7(K) = 0
010340 NEXT K
010350 FOR N = 1 TO 7
010360 IF T6(N) <= 0 THEN JMP666
```

```
010370 K2 = 0
010380 FOR K = 1 TO 7
010390 T5(K) = A2(N,K)*(T6(N) + Q7(N,J-1))
010400 K2 = K2 + T5(K)
010410 NEXT K
010420 IF K2 > 0 THEN JMP674
010430 Q7(N,J-1) = T6(N)
010440 GOTO JMP666
010450 JMP674:T5(8) = 0
010460 Q7(N,J-1) = 0
010470 FOR I = 1 TO 7
010480 T5(I) = T5(I) + Q7(N,J-1)
010490 CONVERT STR(T9$(I,J),1,2) TO T2
010500 CONVERT STR(T9$(N,J-1),24,3) TO T1
010510 IF T5(I) <= 0 THEN JMP821
010520 IF STR(T9$(I,J),3*N,3) = "NNN" THEN JMP821
010530 GOSUB' 55(T1,T2,T5(I),I,J)
010540 GOSUB' 61(T1,T2,T5(I),N,I,J,S)
010550 CONVERT STR(T9$(I,J),3*N,3) TO D2
010560 D2 = D2 + INT(C2+.5)
010570 CONVERT D2 TO STR(T9$(I,J),3*N,3),PIC(###)
010530 T5(I) = DLT
010590 T7(I) = T7(I) + I2
010600 JMP821:Q7(N,J-1) = T5(I)
010610 NEXT I
010620 JMP666:NEXT N
010630 FOR N = 1 TO 7
010640 IF Q7(N,J-1) <= 0 THEN JMP675
010650 CONVERT STR(T9$(N,J-1),24,3) TO T1
010660 K2 = 0
010670 FOR K = 1 TO 7
010680 T5(K) = A2(N,K)*Q7(N,J-1)
010690 K2 = K2 + T5(K)
010700 NEXT K
010710 T5(8) = 0
010720 IF K2 <= 0 THEN JMP675
010730 Q7(N,J-1) = 0
010740 FOR I = 1 TO 7
010750 T5(I) = T5(I) + Q7(N,J-1)
010760 IF T5(I) <= 0 THEN JMP678
010770 IF STR(T9$(I,J),3*N,3) = "NNN" THEN JMP673
010780 CONVERT STR(T9$(I,J),1,2) TO T2
010790 GOSUB' 54(T1,T2)
010800 S2 = 0
010810 FOR K = 1 TO T17(1)
010820 S2 = S2 + INVT(3,INT(T1/12+K))
010830 NEXT K
010840 IF S2 <= 0 THEN JMP673
010850 B = (1-R0(INT((T1+T2)/12+1)))*((T1+T2)/12-INT((T1+T2)/12))
010860 A6 = (2-B)*((T1+T2)/12-INT((T1+T2)/12))/(1+R0(INT((T1+T2)/12+1)))
010870 S1 = (1-A6)*INVT(3,INT(T1/12+T17(1)))
010880 S2 = S2 - S1
```

```
010890 FOR K = 1 TO T17(1)
010900 INVT(8,INT(T1/12+K)) = S2*T17(K+1)
010910 NEXT K
010920 INVT(8,INT(T1/12+T17(1))) = INVT(8,INT(T1/12+T17(1))) + S1
010930 GOSUB' 55(T1,T2,T5(I),I,J)
010940 GOSUB' 61(T1,T2,T5(I),N,I,J,S)
010950 CONVERT STR(T9$(I,J),3*N,3) TO D2
010960 D2 = D2 + INT(C2+.5)
010970 CONVERT D2 TO STR(T9$(I,J),3*N,3),PIC(###)
010980 T5(I) = DLT
010990 T7(I) = T7(I) + I2
011000 JMP678:Q7(N,J-1) = T5(I)
011010 NEXT I
011020 JMP675:NEXT N
011030 FOR N = 1 TO 7
011040 GOSUB' 58(J,S)
011050 IF Q7(N,J-1) <= 0 THEN JMP679
011060 IF Z3$ <> "YES" THEN JMP2005
011070 GOSUB' 66(N,J,S)
011080 FOR K = 1 TO 7
011090 T7(K) = T7(K) + T17(K)
011100 NEXT K
011110 JMP2005:IF Q7(N,J-1) <= 0 THEN JMP679
011120 CONVERT STR(T9$(N,J-1),24,3) TO T1
011130 T2 = OAT
011140 GOSUB' 55(T1,T2,Q7(N,J-1),7,J)
011150 GOSUB' 61(T1,T2,Q7(N,J-1),N,9,J,S)
011160 T7(7) = T7(7) + I2
011170 OUTA(J) = OUTA(J) + C2
011180 JMP679:NEXT N
011190 GOSUB' 65(J)
011200 GOSUB' 68(J,S)
011210 IF Z1$ <> "YES" THEN JMP681
011220 INIT(HEX(20))C$
011230 STR(C$,1,12) = "CHECK J, J = "
011240 CONVERT J TO STR(C$,14,1),PIC(#)
011250 STR(C$,15,20) = "      PF-14 FOR DATA"
011260 STOP C$
011270 JMP681:NEXT J
011280 ********************************************************************
011290 *                                                                  *
011300 *       ITERATION COMPLETE.  COMPUTE REMAINING REQUIREMENT         *
011310 *       AND DEVELOP INCREMENTAL ACCESSION REQUIREMENT.             *
011320 *       THIS IS IMPLEMENTED AS A TWO STAGE PROCESS.  ALL           *
011330 *       ACTIVITIES EXCEPT "OTHER" ARE TESTED FOR COMPLETION        *
011340 *       IN THE FIRST STAGE.  WHEN THESE REQUIREMENTS ARE           *
011350 *       MET AN OUTPUT DISPLAY IS GENERATED AND THE PROGRAM         *
011360 *       CAN THEN PROCEED TO COMPLETE THE "OTHER" REQUIREMENT       *
011370 *                                                                  *
011380 ********************************************************************
011390 D2 = 0:S2 = 0:T1 = 12
011400 FOR J = 1 TO 4
```

```
011410 FOR I = 1 TO 6
011420 IF DO(I,J) <= 0 THEN JMP810
011430 D2 = D2 + DO(I,J)
011440 JMP810:NEXT I
011470 NEXT J
011480 IF D2 < 2 THEN JMP2011
011540 I0 = D2/4
011550 GOSUB' 53(I0,T1)
011560 T50 = T50 + 1
011570 IF Z1$ <> "YES" THEN JMP813
011580 INIT(HEX(20))C$
011590 STR(C$,1,37) = "ITERATION     ,        ACCESSIONS ADDED"
011600 CONVERT T50 TO STR(C$,11,2),PIC(##)
011610 CONVERT ROUND(INVTC(31),1) TO STR(C$,16,5),PIC(###.#)
011620 GOSUB' 59(C$)
011630 GOSUB' 80
011640 JMP813:GOSUB' 63
011650 GOSUB' 67
011660 GOTO JMP300
011670 ************************************************************
011680 *                                                          *
011690 *       FIRST STAGE REQUIREMENTS TESTING COMPLETE.  BEGIN  *
011700 *       TESTING OF "OTHER" REQUIREMENTS.                   *
011710 *                                                          *
011720 ************************************************************
011730 JMP2011:IF T51 > 0 THEN JMP1837
011740 GOSUB' 80
011741 E$ = "ALL REQUIREMENTS EXCEPT 'OTHER' COMPLETELY FILLED"
011742 STR(E$,105,13)  = "ITERATIONS = "
011743 CONVERT T50 TO STR(E$,118,2),PIC(##)
011750 IF PR = 0 THEN GOSUB' 72
011760 JMP1837:D2 = 0:S2 = 0:I1 = 12
011770 FOR J = 1 TO 4
011780 D2 = D2 + DO(7,J)
011810 NEXT J
011820 IF D2 < 2 THEN JMP820
011880 I0 = D2/4
011890 GOSUB' 53(I0,T1)
011900 IF Z1$ <> "YES" THEN JMP315
011910 INIT(HEX(20))C$
011920 STR(C$,1,35) = "OTHER REQUIREMENTS REMAINING =  "
011930 CONVERT ROUND(D2,1) TO STR(C$,32,5),PIC(###.#)
011940 GOSUB' 59(C$)
011950 GOSUB' 80
011960 JMP315:T51 = T51 + 1
011970 GOSUB' 63
011980 GOSUB' 67
011990 GOTO JMP300
012000 ************************************************************
012010 *       REQUIREMENTS DETERMINATION IS COMPLETE.  DISPLAY   *
012020 *       OUTPUTS AND SELECT PRINT OPTION.  AFTER PRINT MODEL*
012030 *       RESETS IN PREPARATION FOR A NEW RUN.               *
```

```
012040 *                                                              *
012050 ****************************************************************
012060 JMP820:GOSUB' 80
012061 INIT(HEX(20))E$
012062 E$ = "ALL REQUIREMENTS MET"
012063 STR(E$,105,13) = "ITERATIONS = "
012064 CONVERT T50 TO STR(E$,118,2),PIC(##)
012065 STR(E$,120,1) = "/"
012066 CONVERT T51 TO STR(E$,121,2),PIC(##)
012070 IF PR = 0 THEN GOSUB' 72
012080 GOSUB' 69
012090 IF M>15 THEN SKP40
012100 PTR(A1(M,1)) = PTR(A1(M,1)) + INVT(8,31)
012110 PTR(8) = PTR(8) + ACC1
012120 GOTO SKP41
012130 SKP40:PTR(A1(M-15,2)) = PTR(A1(M-15,2)) + INVT(8,31)
012140 PTR(9) = PTR(9) + ACC1
012150 SKP41:GOTO JMP5000
012160 ****************************************************************
012170 *                                                              *
012180 *                          SUBROUTINES                         *
012190 *                                                              *
012200 ****************************************************************
012210 *                                                              *
012220 *     #71 - THIS SUBROUTINE PRODUCES PRINTS OF THE             *
012230 *           SCREEN.  IT IS CALLED FROM #59 FOR IND-            *
012240 *           IVIDUAL PRINTS AND FROM # 13 FOR ALL.              *
012250 *                                                              *
012260 ****************************************************************
012270 DEFFN' 71(N)
012280 SELECT PRINTER
012290 INIT(HEX(2A))X$$                          /*   (*)   */
012300 ON N GOTO JMP1501,JMP1402,JMP1403,JMP1502,JMP1404,JMP1405
012310 JMP1501:N$ = HEX(FF)
012320 FOR Q = 1 TO 4
012330 D9(Q) = 0
012340 FOR P = 1 TO 7
012350 D9(Q) = D9(Q) + D0(P,Q)
012360 NEXT P
012370 D9(Q) = (D8(Q) - D9(Q))/D9(Q)
012380 NEXT Q
012390 D10 = 0
012400 FOR P = 1 TO 7
012410 D10 = D10 + INVT(P,1)
012420 NEXT P
012430 P9 = INT((79-P5-P6-25)/2)
012440 P10 = INT((79-LEN(X$))/2)
012450 STR(D$,1,2) = STR(DATE,3,2)
012460 STR(D$,3,1) = "/"
012470 STR(D$,4,2) = STR(DATE,5,2)
012480 STR(D$,6,1) = "/"
012490 STR(D$,7,2) = STR(DATE,1,2)
```

```
012500 STR(T$,1,2) = STR(TIME,1,2)
012510 STR(T$,3,1) = ":"
012520 STR(T$,4,2) = STR(TIME,3,2)
012530 INIT(HEX(20))P1$(1)
012540 STR(P1$(1),1,10) = "WORKING ON"
012550 STR(P1$(1),12,P5) = A$
012560 STR(P1$(1),13+P5,2) = "IN"
012570 STR(P1$(1),16+P5,P6) = TYPE$(Q11)
012580 STR(P1$(1),17+P5+P6,9) = "COMMUNITY"
012590 PRINT PAGE
012600 PRINT X5$
012610 PRINT SKIP(4),COL(21+P9),P1$(1)
012620 PRINT USING SHP10,X$,D$
012630 SHP10:FMT COL(30),CH(40),COL(80),CH(8)
012640 PRINT COL(80),T$
012650 PRINT SKIP(1),COL(41),"FRACTION OF FILL"
012660 PRINT USING SHP1,"SENIOR COMMANDERS",D9(4)
012670 PRINT USING SHP1,"COMMANDERS",D9(3)
012680 PRINT USING SHP1,"LT. COMMANDERS",D9(2)
012690 PRINT USING SHP1,"LT. AND BELOW",D9(1)
012700 SHP1:FMT COL(36),CH(19),COL(56),PIC(##.###)
012710 PRINT COL(36),"========================="
012720 PRINT SKIP(1)
012730 PRINT USING SHP2,"ACCESSIONS",D10
012740 PRINT USING SHP2,"FIRST TOUR LENGTH",T11
012750 SHP2:FMT COL(31),CH(18),COL(60),PIC(###.#)
012760 PRINT SKIP(2),X5$
012770 SELECT CRT
012780 N$ = N$ XOR HEX(FF)
012790 RETURN
012800 JMP1402:/*OUTPUT MATRIX I4*/
012810 FOR P = 1 TO 7
012820 INIT(HEX(20))P1$(P)
012830 FOR R = 1 TO 7
012840 CONVERT I4(P,R) TO STR(P1$(P),7*R-6,6),PIC(###.##)
012850 NEXT R
012860 NEXT P
012870 IF N$ = HEX(00) THEN JMP5050
012880 PRINT PAGE
012890 PRINT X5$
012900 JMP5050:N$ = N$ XOR HEX(FF)
012910 PRINT SKIP(4),TAB(53),"NODE FLOW VALUES"
012920 PRINT SKIP(1),TAB(55),"TOUR NUMBERS"
012930 PRINT SKIP(1)
012940 PRINT USING SHP9, "ACTIVITY","ONE","TWO","THREE","FOUR","FIVE",  !
012950 "SIX","SEVEN"
012960 SHP9:FMT COL(29),CH(8),COL(50),CH(3),COL(57),CH(3),COL(63),CH(5),!
012970 COL(70),CH(4),COL(77),CH(4),COL(85),CH(3),COL(91),CH(5)
012980 PRINT SKIP(1)
012990 PRINT USING SHP3,LABEL$(1),P1$(1)
013000 SHP3:FMT COL(23),CH(24),COL(43),CH(49)
013010 PRINT USING SHP3,LABEL$(2),P1$(2)
```

```
013020 PRINT USING SHP3,LABEL$(3),P1$(3)
013030 PRINT USING SHP3,LABEL$(4),P1$(4)
013040 PRINT USING SHP3,LABEL$(5),P1$(5)
013050 PRINT USING SHP3,LABEL$(6),P1$(6)
013060 PRINT USING SHP3,LABEL$(7),P1$(7)
013070 PRINT SKIP(1),TAB(26),"**********************************************!
013080 ********************"
013090 PRINT SKIP(2),X5$
013100 SELECT CRT
013110 RETURN
013120 JMP1403:/*OUTPUT SELECTED INVENTORY ENTRIES*/
013130 IF N$ = HEX(00) THEN JMP5051
013140 PRINT PAGE
013150 PRINT X5$
013160 JMP5051:N$ = N$ XOR HEX(FF)
013170 PRINT SKIP(4),COL(53),"INVENTORY DISPLAY"
013180 PRINT SKIP(1),COL(31),"SELECT FOUR YEARS FOR OUTPUT BETWEEN 1 AND!
013190 30"
013200 PRINT SKIP(2)
013210 PRINT USING SHP4,"FIRST YEAR",T15(1)
013220 SHP4:FMT COL(36),CH(14),COL(51),PIC(##)
013230 PRINT SKIP(1)
013240 PRINT USING SHP4,"SECOND YEAR",T15(2)
013250 PRINT SKIP(1)
013260 PRINT USING SHP4,"THIRD YEAR",T15(3)
013270 PRINT SKIP(1)
013280 PRINT USING SHP4,"FOURTH YEAR",T15(4)
013290 PRINT SKIP(2),X5$
013300 SELECT CRT
013310 RETURN
013320 JMP1502:/*CREATE AND DISPLAY INVT SELECTION*/
013330 FOR P = 1 TO 9
013340 INIT(HEX(20))P1$(P)
013350 STR(P1$(P),1,24) = LABEL$(P)
013360 FOR R = 1 TO 4
013370 CONVERT INVT(P,T15(R)) TO STR(P1$(P),18+9*R,6),PIC(###.##)
013380 NEXT R
013390 NEXT P
013400 IF N$ = HEX(00) THEN JMP5052
013410 PRINT PAGE
013420 PRINT X5$
013430 JMP5052:N$ = N$ XOR HEX(FF)
013440 PRINT SKIP(2),TAB(53),"INVENTORY DISPLAY"
013450 PRINT SKIP(3),TAB(59),"YEARS"
013460 PRINT USING SHP5,"ACTIVITY",T15(1),T15(2),T15(3),T15(4)
013470 SHP5:FMT COL(37),CH(10),COL(59),PIC(##),COL(63),PIC(##),COL(77), !
013480 PIC(##),COL(86),PIC(##)
013490 PRINT SKIP(1),TAB(29),P1$(1)
013500 PRINT TAB(29),P1$(2)
013510 PRINT TAB(29),P1$(3)
013520 PRINT TAB(29),P1$(4)
013530 PRINT TAB(29),P1$(5)
```

```
013540 PRINT TAB(29),P1$(6)
013550 PRINT TAB(29),P1$(7)
013560 PRINT TAB(29),P1$(8)
013570 PRINT SKIP(1),TAB(26),"*****************************************!
013580 ****************************"
013590 PRINT SKIP(1),TAB(29),P1$(9)
013600 PRINT SKIP(1),TAB(26),"*****************************************!
013610 ****************************"
013620 PRINT SKIP(2),X5$
013630 SELECT CRT
013640 RETURN
013650 JMP1404:/*DISPLAY REQUIREMENTS MATRIX*/
013660 FOR P = 1 TO 7
013670 INIT(HEX(20))P1$(P)
013680 STR(P1$(P),1,24) = LABEL$(P)
013690 FOR R = 1 TO 4
013700 CONVERT D0(P,R) TO STR(P1$(P),13+9*R,7),PIC(####.##)
013710 NEXT R
013720 NEXT P
013730 INIT(HEX(20))P1$(8)
013740 STR(P1$(8),1,24) = "LOWER GRADE FILLS"
013750 FOR R = 1 TO 3
013760 CONVERT Q37(R) TO STR(P1$(8),27+9*R,7),PIC(####.##)
013770 NEXT R
013780 IF N$ = HEX(00) THEN JMP5053
013790 PRINT PAGE
013800 PRINT X5$
013810 JMP5053:N$ = N$ XOR HEX(FF)
013820 PRINT SKIP(2),TAB(52),"REQUIREMENTS DISPLAY"
013830 PRINT SKIP(3),TAB(57),"CATEGORY"
013840 PRINT TAB(37),"ACTIVITY                LT      LCDR      CDR       CD!
013850 R+"
013860 PRINT SKIP(1),TAB(29),P1$(1)
013870 PRINT TAB(29),P1$(2)
013880 PRINT TAB(29),P1$(3)
013890 PRINT TAB(29),P1$(4)
013900 PRINT TAB(29),P1$(5)
013910 PRINT TAB(29),P1$(6)
013920 PRINT TAB(29),P1$(7)
013930 PRINT SKIP(1),TAB(26),"*****************************************!
013940 ****************************"
013950 PRINT SKIP(1),TAB(29),P1$(8)
013960 PRINT SKIP(1),TAB(26),"*****************************************!
013970 ****************************"
013980 PRINT SKIP(2),X5$
013990 SELECT CRT
014000 RETURN
014010 JMP1405:/*DISPLAY SURPLUS FLOWS (Q7) */
014020 FOR P = 1 TO 8
014030 INIT(HEX(20))P1$(P)
014040 STR(P1$(P),1,24) = LABEL$(P)
014050 FOR R = 1 TO 7
```

```
014060 CONVERT ROUND(Q7(P,R),1) TO STR(P1$(P),21+5*R,4),PIC(##.#)
014070 NEXT R
014080 NEXT P
014090 STR(P1$(8),1,24) = "NON-AVIATION MAN-YEARS"
014100 FOR R = 1 TO 7
014110 CONVERT ROUND(OUTA(R),1) TO STR(P1$(8),21+5*R,4),PIC(##.#)
014120 NEXT R
014130 IF N$ = HEX(00) THEN JMP5054
014140 PRINT PAGE
014150 PRINT X5$
014160 JMP5054:N$ = N$ XOR HEX(FF)
014170 PRINT SKIP(2),TAB(49),"SURPLUS FLOW (Q7) DISPLAY"
014180 PRINT SKIP(3),TAB(72),"TOUR"
014190 PRINT TAB(37),"ACTIVITY              1    2    3    4    5    6    !
014200 7"
014210 PRINT SKIP(1),TAB(29),P1$(1)
014220 PRINT TAB(29),P1$(2)
014230 PRINT TAB(29),P1$(3)
014240 PRINT TAB(29),P1$(4)
014250 PRINT TAB(29),P1$(5)
014260 PRINT TAB(29),P1$(6)
014270 PRINT TAB(29),P1$(7)
014280 PRINT SKIP(1),TAB(26),"*********************************************!
014290 ****************************"
014300 PRINT SKIP(1),TAB(29),P1$(8)
014310 PRINT SKIP(1),TAB(26),"*********************************************!
014320 ****************************"
014330 PRINT SKIP(2),X5$
014340 SELECT CRT
014350 RETURN
014360 ************************************************************
014370 *                                                          *
014380 *      #72 - THIS SUBROUTINE CONTAINS THE PRINT            *
014390 *            ROUTINES FOR THE OUTPUT TABLES OF THE         *
014400 *            MODEL                                         *
014410 *                                                          *
014420 ************************************************************
014430 DEFFN' 72
014440 INIT(HEX(3D))X4$
014450 INIT(HEX(2A))X5$
014460 INIT(HEX(20))B$
014470 INIT(HEX(20))C$
014480 FOR P = 1 TO 7
014490 FOR Q = 1 TO 7
014500 Q7(P,Q) = 0
014510 NEXT Q
014520 T5(P) = 0
014530 NEXT P
014540 FOR P = 1 TO 7
014550 FOR Q = 1 TO 10
014560 Q7(P,1) = Q7(P,1) + ROUND(INVT(P,Q),0)
014570 Q7(P,5) = Q7(P,5) + ROUND(INVT(P,Q),0)
```

```
014580 NEXT Q
014590 FOR Q = 11 TO 15
014600 Q7(P,2) = Q7(P,2) + ROUND(INVT(P,Q),0)
014610 Q7(P,5) = Q7(P,5) + ROUND(INVT(P,Q),0)
014620 NEXT Q
014630 FOR Q = 16 TO D30
014640 Q7(P,3) = Q7(P,3) + ROUND(INVT(P,Q),0)
014650 Q7(P,5) = Q7(P,5) + ROUND(INVT(P,Q),0)
014660 NEXT Q
014670 FOR Q = D30+1 TO 26
014680 Q7(P,4) = Q7(P,4) + ROUND(INVT(P,Q),0)
014690 Q7(P,5) = Q7(P,5) + ROUND(INVT(P,Q),0)
014700 NEXT Q
014710 NEXT P
014720 FOR Q = 1 TO 9
014730 T5(1) = T5(1) + ROUND(INVT(9,Q),0)
014740 T5(5) = T5(5) + ROUND(INVT(9,Q),0)
014750 NEXT Q
014760 FOR Q = 10 TO 15
014770 T5(2) = T5(2) + ROUND(INVT(9,Q),0)
014780 T5(5) = T5(5) + ROUND(INVT(9,Q),0)
014790 NEXT Q
014800 FOR Q = 16 TO D30
014810 T5(3) = T5(3) + ROUND(INVT(9,Q),0)
014820 T5(5) = T5(5) + ROUND(INVT(9,Q),0)
014830 NEXT Q
014840 FOR Q = D30+1 TO 26
014850 T5(4) = T5(4) + ROUND(INVT(9,Q),0)
014860 T5(5) = T5(5) + ROUND(INVT(9,Q),0)
014870 NEXT Q
014880 IF M > 15 THEN B = M - 15 ELSE B = M
014890 STR(B$,INT((23-LEN(TYPE$(Q11)))/2),LEN(TYPE$(Q11))) = TYPE$(Q11)
014900 STR(B$,INT((23-LEN(TYPE$(Q11)))/2)+LEN(TYPE$(Q11))+2,9) = "COMMUN
014910 ITY"
014920 STR(D$,1,2) = STR(DATE,3,2)
014930 STR(D$,3,1) = "/"
014940 STR(D$,4,2) = STR(DATE,5,2)
014950 STR(D$,6,1) = "/"
014960 STR(D$,7,2) = STR(DATE,1,2)
014970 STR(T$,1,2) = STR(TIME,1,2)
014980 STR(T$,3,1) = ":"
014990 STR(T$,4,2) = STR(TIME,3,2)
015000 SELECT PRINTER
015010 PRINT PAGE
015020 PRINT SKIP(5)
015030 PRINT TAB(49),B$
015040 PRINT SKIP(1),TAB(59),"SUMMARY DATA"
015050 IF A$ = "NAVAL AVIATORS" THEN PRINT SKIP(2),TAB(59),A$,TAB(120), !
015060 D$ ELSE PRINT SKIP(2),TAB(55),A$,TAB(120),D$
015070 PRINT TAB(120),T$
015080 PRINT SKIP(1),X5$
015090 PRINT SKIP(2)
```

```
015100 PRINT USING SHP20,"RETENTION",ROUND(R02*100,0),"%",                    !
015110 "NUMBER OF SQUADRONS",S1(3,1)
015120 SHP20:FMT COL(10),CH(20),COL(32),PIC(##),COL(35),CH(1),COL(75),        !
015130 CH(25),COL(105),PIC(##)
015140 PRINT USING SHP30,"AIRCRAFT PER SQUADRON",S1(3,2)
015150 SHP30:FMT COL(74),CH(25),COL(105),PIC(##)
015160 PRINT USING SHP31,"PLOWBACK FRACTION",P0(1)*100,"%","CREW FACTOR"!
015170 ,S1(8,3)
015180 SHP31:FMT COL(10),CH(20),COL(32),PIC(##),COL(35),CH(1),COL(74),        !
015190 CH(25),COL(106),PIC(#.##)
015200 IF M > 15 THEN S = 5 ELSE S = 4
015210 STR(C$,1,LEN(A$)) = A$
015220 STR(C$,2+LEN(A$),8) = "PER CREW"
015230 PRINT USING SHP51,C$,S1(8,S)
015240 SHP51:FMT COL(74),CH(30),COL(106),PIC(#.##)
015250 PRINT SKIP(2),X5$
015260 PRINT SKIP(2),TAB(57),"COMMUNITY POPULATION"
015270 PRINT SKIP(1)
015280 IF A$ = "NAVAL AVIATORS" THEN                                          !
015290         TDES$ = "ACCESSIONS TO TRAINING (139X)" ELSE                  !
015300         TDES$ = "ACCESSIONS TO TRAINING (137X)"
015310 IF A$ = "NAVAL AVIATORS" THEN                                          !
015320          DES$ = "ACCESSIONS TO 131X DESIGNATOR" ELSE                  !
015330          DES$ = "ACCESSIONS TO 132X DESIGNATOR"
015340 IF A$ = "NAVAL AVIATORS" THEN J1 = 1 ELSE J1 = 2
015350 ACC1 = (INVT(8,31))*TCO(A1(8,J1),1)
015360 PRINT USING SHP33,TDES$,ROUND(ACC1,0),"SENIOR COMMANDERS",T3(1)
015370 SHP33:FMT COL(10),CH(30),COL(42),PIC(####),COL(55),CH(18),COL(75)!
015380 ,PIC(####)
015390 PRINT USING SHP34,"COMMANDERS",T8(2),"COMMAND OPPORTUNITY",T8(9)
015400 SHP34:FMT COL(55),CH(18),COL(75),PIC(####),COL(90),CH(23),COL(115!
015410 ),PIC(#.##)
015420 PRINT USING SHP35,DES$,ROUND(INVT(8,31),0),"LT. COMMANDERS",T3(3)!
015430 ,"DEPT HEAD OPPORTUNITY",T8(8)
015440 SHP35:FMT COL(10),CH(30),COL(42),PIC(####),COL(55),CH(18),COL(75)!
015450 ,PIC(####),COL(90),CH(23),COL(115),PIC(#.##)
015460 PRINT USING SHP33,"FIRST TOUR LENGTH",X46,"LIEUTENANTS",T3(4)
015470 PRINT SKIP(1)
015480 PRINT USING SHP34,"      TOTALS",D3
015490 D3 = ROUND((T5(5)/D3)*100,0)
015500 PRINT SKIP(2),X5$
015510 PRINT SKIP(2),TAB(29),"DISTRIBUTION BY GRADE AND ACTIVITY"
015520 PRINT SKIP(1),TAB(21),"ACTIVITY                                GRADE"
015530 PRINT TAB(45),"LT     LCDR    CDR   SEN CDR  TOTAL                  !
015540  ACIP PROJECTIONS"
015550 FOR P = 1 TO 7
015560 PRINT USING SHP36,LABEL$(P);
015570 FOR Q = 1 TO 4
015580 PRINT USING SHP37,Q7(P,Q);
015590 NEXT Q
015600 PRINT USING SHP38,Q7(P,5);
015610 ON P GOTO LIN6,LIN2,LIN3,LIN4,LIN6,LIN6,LIN5
```

```
015620 LIN2:PRINT USING SHP39,"GATE 1",T3(5)
015630 GOTO LIN1
015640 LIN3:PRINT USING SHP39,"GATE 2",T3(6)
015650 GOTO LIN1
015660 LIN4:PRINT USING SHP39,"GATE 3",T3(7)
015670 GOTO LIN1
015680 LIN5:PRINT USING SHP40,"NON AVIATION",D3,"%"
015690 GOTO LIN1
015700 LIN6:PRINT SKIP(1)
015710 LIN1:NEXT P
015720 PRINT USING SHP36,LABEL$(9);
015730 FOR Q = 1 TO 4
015740 PRINT USING SHP37,T5(Q);
015750 NEXT Q
015760 PRINT USING SHP38,T5(5)
015770 SHP36:FMT COL(14),CH(25)
015780 SHP37:FMT COL(36),PIC(########)
015790 SHP38:FMT COL(71),PIC(########)
015800 SHP39:FMT COL(95),CH(6),COL(106),PIC(#.##)
015810 SHP40:FMT COL(86),CH(12),COL(107),PIC(##),COL(110),CH(1)
015820 PRINT SKIP(2),X5$
015821 PRINT SKIP(2),TAB(1),E$
015830 PRINT PAGE
015840 /*  INVENTORY PROFILE PRINT  */
015850 IF A$ = "NAVAL AVIATORS" THEN PRINT SKIP(5),TAB(58),A$ ELSE      !
015860 PRINT SKIP(5),TAB(55),A$
015870 PRINT SKIP(1),TAB(49),B$
015880 PRINT SKIP(3),TAB(58),"INVENTORY DISPLAY",TAB(120),D$
015890 PRINT TAB(120),T$
015900 PRINT SKIP(3),TAB(54),"YEARS OF AVIATION SERVICE"
015910 PRINT SKIP(2),TAB(10),"ACTIVITY",TAB(33),"1     2     3     4     5  !
015920   6     7     8     9    10    11    12    13    14    16    18    20    22  !
015930  24    26"
015940 PRINT SKIP(1),TAB(1),X4$
015950 FOR P = 1 TO 8
015960 PRINT SKIP(1)
015970 PRINT USING FLOW1,LABEL$(P);
015980 FOR Q = 1 TO 13
015990 PRINT USING FLOW2, ROUND(INVT(P,Q),0);
016000 NEXT Q
016010 FOR Q = 14 TO 24 STEP 2
016020 PRINT USING FLOW2,ROUND(INVT(P,Q),0);
016030 NEXT Q
016040 PRINT USING FLOW2, ROUND(INVT(P,26),0)
016050 NEXT P
016060 FLOW1:FMT COL(2),CH(25),XX(2)
016070 FLOW2:FMT COL(23),PIC(#####)
016080 PRINT SKIP(1),TAB(1),X4$
016090 PRINT SKIP(1):PRINT USING FLOW1,LABEL$(9);
016100 FOR Q = 1 TO 13
016110 PRINT USING FLOW2, ROUND(INVT(9,Q),0);
016120 NEXT Q
```

```
016130 FOR Q = 14 TO 26 STEP 2
016140 PRINT USING FLOW2,ROUND(INVT(9,Q),0);
016150 NEXT Q
016160 PRINT SKIP(1),TAB(1),X4$
016170 SELECT CRT
016180 RETURN
016190 ********************************************************************
016200 *                                                                  *
016210 *      #73 - THIS SUBROUTINE PROVIDES A COMPLETE SET               *
016220 *            OF OUTPUT SCREEN PRINTS.  INVENTORY OUT               *
016230 *            DISPLAY IS GOVERNED IN RANGE BY THE FIRST             *
016240 *            TWO ENTRIES IN YEARS SELECT.                          *
016250 *                                                                  *
016260 ********************************************************************
016270 DEFFN' 73
016280 N$ = HEX(FF)
016290 GOSUB' 71(1)
016300 GOSUB' 71(2)
016310 INIT(HEX(3D))X4$
016320 INIT(HEX(2A))X5$
016330 INIT(HEX(20))B$
016340 STR(B$,1,LEN(TYPE$(Q11))) = TYPE$(Q11)
016350 STR(B$,LEN(TYPE$(Q11))+2,9) = "COMMUNITY"
016360 SELECT PRINTER
016370 IF N$ = HEX(00) THEN JMP5057
016380 PRINT PAGE
016390 PRINT X5$
016400 JMP5057:N$ = N$ XOR HEX(FF)
016410 PRINT SKIP(2),TAB(54),B$
016420 PRINT SKIP(1),TAB(58),"INVENTORY DISPLAY"
016430 PRINT SKIP(1),TAB(54),"YEARS OF AVIATION SERVICE"
016440 PRINT SKIP(1),TAB(10),"ACTIVITY",TAB(32),"1    2    3    4    5  !
016450   6    7    8    9   10   11   12   13   14   15   16   17   18  !
016460  19   20"
016470 PRINT SKIP(1),TAB(1),X4$
016480 FOR P = 1 TO 8
016490 PRINT USING FLOW10,LABEL$(P);
016500 FOR Q = 1 TO 19
016510 PRINT USING FLOW20, ROUND(INVT(P,Q),0);
016520 NEXT Q
016530 PRINT USING FLOW20, ROUND(INVT(P,20),0)
016540 NEXT P
016550 FLOW10:FMT COL(2),CH(25),XX(2)
016560 FLOW20:FMT COL(28),PIC(###,#)
016570 PRINT SKIP(1),TAB(1),X4$
016580 PRINT USING FLOW1,LABEL$(9);
016590 FOR Q = 1 TO 19
016600 PRINT USING FLOW2, ROUND(INVT(9,Q),0);
016610 NEXT Q
016620 PRINT USING FLOW2,ROUND(INVT(9,20),0)
016630 PRINT TAB(1),X4$
016640 PRINT SKIP(2),X5$
```

```
016650 SELECT CRT
016660 GOSUB' 71(5)
016670 GOSUB' 71(6)
016680 GOSUB' 71(7)
016690 GOSUB' 71(8)
016700 RETURN
016710 ************************************************************
016720 *                                                          *
016730 *      #14 - THIS SUBROUTINE PROVIDES ACCESS TO THE        *
016740 *            IN-PROCESS MONITOR DISPLAYS IN RESPONSE       *
016750 *            TO TEMPORARILY INSERTED STOPS.                *
016760 *                                                          *
016770 ************************************************************
016780 DEFFN' 14(C$)
016790 B$ = "RESPONSE TO STOP"
016800 STR(X$,1,16) = B$
016810 STR(X$,18,20) = C$
016820 GOSUB' 59(X$)
016830 RETURN
016840 ************************************************************
016850 *                                                          *
016860 *      #51 - THIS SUBROUTINE COMPUTES THE ARC              *
016870 *            CAPACITY FACTOR (RTL) IN RESPONSE TO          *
016880 *            SPECIFICATION OF START TIME (T1) IN           *
016890 *            YEARS AND TOUR LENGTH (T20) IN MONTHS         *
016900 *                                                          *
016910 ************************************************************
016920 DEFFN' 51 (T1,T2)
016930 T10 = T1/12:T3 = T2
016940 R9 = 0:H = 1:T = INT(T10+1):B = 1-RO(T)
016950 IF T = T10 + 1 THEN JUMP1
016960 B = (T-T10)*(1-RO(T))
016970 R9 = (2-B)*(T-T10)
016980 IF (T-T10)*12 > T3 THEN JUMP2
016990 T3 = T3 - (T-T10)*12
017000 JUMP5:H = H*(1-B)
017010 T = T + 1
017020 B = 1 - RO(T)
017030 JUMP1:IF T3 = 0 THEN JUMP3
017040 IF T3 < 12 THEN JUMP4
017050 R9 = R9 + H*(2-B)
017060 T3 = T3 - 12
017070 GOTO JUMP5
017080 JUMP2:H = H*(1-B)
017090 B = ((T-T10)-(T3/12))*(1-RO(T))
017100 R9 = R9 - H*((2-B)/(1-B))*((T-T10)-(T3/12))
017110 GOTO JUMP3
017120 JUMP4:B = (T3/12)*(1-RO(T))
017130 R9 = R9 + H*(2-B)*(T3/12)
017140 JUMP3:RETURN
017150 ************************************************************
017160 *                                                          *
```

```
017170 *     #52 - THIS SUBROUTINE COMPUTES THE FIRST TOUR           *
017180 *           LENGTH (T2) NECESSARY TO SUPPORT A FLOW          *
017190 *           IO AND REQMT D5 GIVEN PLOWBACK TOUR (T3)         *
017200 *           AND CONTINUATION (R4)                            *
017210 *                                                            *
017220 ************************************************************
017230 DEFFN' 52 (T3,IO,D5,R4)
017240 K1 = (24*D5/IO)/((1-PO(1))+PO(1)*(R4**(T3/12))) + (1+(R4**(7/12))!
017250       )*7
017260 T1 = K1/2
017270 T11 = K1/(1+(R4**(T1/12))) - 1
017280 IF T11 > 60 THEN T11 = 60
017290 T2 = INT(T11+.5)
017300 FOR P = 1 TO 7
017310 FOR Q = 1 TO 7
017320 IF P > 1 THEN D1 = 1 ELSE D1 = 5
017330 IF P = 1 AND Q < 3 THEN D1 = 7
017340 CONVERT STR(T9$(P,Q),1,2) TO D2
017350 IF D2 = 0 THEN JMP6037
017360 D2 = D2 - D1
017370 CONVERT D2 TO STR(T9$(P,Q),1,2),PIC(##)
017380 JMP6037:NEXT Q
017390 NEXT P
017400 CONVERT T2 TO STR(T9$(1,1),1,2),PIC(##)
017410 CONVERT T2 TO STR(T9$(1,2),1,2),PIC(##)
017420 GOSUB' 67
017430 GOSUB' 83
017440 L = 1
017450 IF M < T5 THEN JMP250
017460 L = L + 1
017470 JMP250:DO(3,1) = DO(3,1) + TCO(A1(Q11,L),3+L)*INVTO(31)
017480 REM COMPUTE PROFESSIONAL EDUCATION NUMBERS
017490 DO(6,1) = DO(6,1) + PO(2)*INVTO(12)*2
017500 DO(6,2) = DO(6,2) + PO(3)*INVTO(18)*.5
017510 DO(6,3) = DO(6,3) + PO(3)*INVTO(18)*.5
017520 FOR I = 1 TO 12
017530 T5(I) = 0
017540 T6(I) = 0
017550 T7(I) = 0
017560 T8(I) = 0
017570 NEXT I
017580 CONVERT STR(T9$(3,1),1,2) TO T12
017590 D3 = INVTO(31)*PO(1)
017600 GOSUB' 55(0,111,INVTO(31)*(1-PO(1)),1,1)
017610 RETURN
017620 ************************************************************
017630 *                                                            *
017640 *     #53 - THIS SUBROUTINE COMPUTES THE ENTRIES FOR         *
017650 *           LOS CELLS IN INVO WHICH RESULT IN EXACTLY        *
017660 *           N PERSONNEL IN YEAR T1                           *
017670 *           NOTE: RO(T3) IS THE RATIO OF THE NUMBER          *
017680 *                 AT THE END OF YEAR T3 TO THAT AT           *
```

```
017690 *                    THE END OF YEAR T3-1. RO(1) = YR1/ACC.      *
017700 *                    THE INVENTORY IN YEAR T3 IS THE AREA        *
017710 *                    UNDER THE DISTRIBUTION CURVE IN THE         *
017720 *                    YEAR T3.                                    *
017730 *                                                                *
017740 ******************************************************************
017750 DEFFN' 53(N,T1)
017760 T3 = INT(T1/12 + 1)
017770 B6 = (T3-T1/12)*(1-RO(T3))
017780 H = N*(1-B6)
017790 H1 = H
017800 FOR P = T3 TO 1 STEP -1
017810 INVTO(P) = H*(1+RO(P))/(2*RO(P))
017820 H = H/RO(P)
017830 NEXT P
017840 INVTO(31) = H
017850 H = H1
017860 FOR P = T3+1 TO 30
017870 INVTO(P) = H*(1+RO(P))/2
017880 H = H*RO(P)
017890 NEXT P
017900 FOR P = 1 TO 31
017910 INVT(8,P) = INVT(8,P) + INVTO(P)
017920 NEXT P
017930 RETURN
017940 ******************************************************************
017950 *                                                                *
017960 *     #54 - THIS SUBROUTINE COMPUTES THE DISTRIBUTION            *
017970 *           OF A UNIT OF CAPACITY OVER AN ARC GIVEN              *
017980 *           THE START TIME (T1) IN MONTHS AND TOUR               *
017990 *           LENGTH (T2) IN MONTHS. THE RESULT IS LEFT            *
018000 *           IN T17( ).                                           *
018010 *                                                                *
018020 ******************************************************************
018030 DEFFN' 54(T1,T2)
018040 T10 = T1/12:T20 = T2/12:L = 1:S20 = 0
018050 FOR P = 1 TO 12
018060 T17(P) = 0
018070 NEXT P
018080 B = (1-RO(INT(T10+1)))*(INT(T10+1)-T10)
018090 T17(L+1) = ((2-B)/2)*(INT(T10+1)-T10)
018100 S20 = S20 + T17(L+1)
018110 L = L+1:H = 1-B
018120 T20 = T20 - (INT(T10+1)-T10)
018130 JMP31:IF T20 < 1 THEN JMP30
018140 T17(L+1) = H*(1+RO(INT(T10+L)))/2
018150 S20 = S20 + T17(L+1)
018160 H = H*RO(INT(T10+L))
018170 T20 = T20 - 1
018180 L = L+1
018190 GOTO JMP31
018200 JMP30:B = T20*(1-RO(INT(T10+L)))
```

```
018210 T17(L+1) = ((2-B)/2)*H*T20
018220 H = H*(1-B)
018230 S20 = S20 + T17(L+1)
018240 T17(1) = L
018250 H = H/S20
018260 FOR P = 2 TO L+1
018270 T17(P) = T17(P)/S20
018280 NEXT P
018290 RETURN
018300 ************************************************************
018310 *                                                          *
018320 *     #55 - THIS SUBROUTINE ACCEPTS START TIME (T1),       *
018330 *           TOUR LENGTH (T2), AND START FLOW (I0). IT      *
018340 *           COMPUTES MANPOWER BY YEAR AND OUTPUT FLOW      *
018350 *           (I2). MANPOWER BY YEAR IN T8( ), T8(1) =       *
018360 *           NO. OF CELLS.                                  *
018370 *                                                          *
018380 ************************************************************
018390 DEFFN' 55(T1,T2,I0,A,B)
018400 T10 = T1/12:T20 = T2/12
018410 T3 = INT(T10+1)
018420 C = 0:C2 = 0:L = 1
018430 FOR P = 1 TO 12
018440 T8(P) = 0
018450 NEXT P
018460 T4 = 1
018470 IF A > 1 THEN JMP21
018480 T4 = T4 + 4
018490 IF B > 2 THEN JMP21
018500 T4 = T4 + 2
018510 JMP21:K1 = (T3-T10)*(1-R0(T3))
018520 H = I0*(1-K1)
018530 T8(L+1) = I0*((2-K1)/2)*(T3-T10)
018540 C2 = C2 + T8(L+1)
018550 T20 = T20 - (T3-T10)
018560 IF T20 >= 0 THEN JMP22
018570 K1 = ((T3-T10)+T20)*(1-R0(T3))
018580 H = H/(1-K1)
018590 T8(L+1) = T8(L+1) -H*((2-K1)/2)*((T3-T10)+T20)
018600 C2 = T8(L+1)
018610 GOTO JMP23
018620 JMP22:L = L+1:T3 = T3+1
018630 IF T20 < 1 THEN JMP24
018640 T8(L+1) = H*(1+R0(T3))/2
018650 H = H*R0(T3)
018660 C2 = C2 + T8(L+1)
018670 T20 = T20 - 1
018680 GOTO JMP22
018690 JMP24:K1 = T20*(1-R0(T3))
018700 T8(L+1) = H*((2-K1)/2)*T2
018710 C2 = C2 + T8(L+1)
018720 T8(1) = L
```

```
018730 I2 = H*(1-K1)
018740 JMP23:T4 = T4/12
018750 T3 = INT(T10+1)
018760 K1 = (T3-T10)*(1-RO(T3))
018770 H = IO*(1-K1)
018780 C = IO*((2-K1)/2)*(T3-T10)
018790 IF T4 >= (T3-T10) THEN JMP29
018800 K1 = ((T3-T10)-T4)*(1-RO(T3))
018810 H = H/(1-K1)
018820 C = C - H*((2-K1)/2)*((T3-T10)-T4)
018830 C = C2 - C
018840 RETURN
018850 JMP29:T4 = T4 - (T3-T10)
018860 T3 = T3 + 1
018870 K1 = T4*(1-RO(T3))
018880 C = C + H*((2-K1)/2)*T4
018890 C = C2 - C
018900 RETURN
018910 ************************************************************
018920 *                                                          *
018930 *     #56 - THIS SUBROUTINE COMPUTES T2 REQUIRED TO        *
018940 *           MATCH A REQUIREMENT D5, SPECIFIED WITHOUT      *
018950 *           PIPELINE, BEGINNING AT T1 WITH INPUT IO.       *
018960 *                                                          *
018970 ************************************************************
018980 DEFFN' 56(T1,IO,D5,I,J)
018990 T10 = T1/12
019000 T4 = 1:T2 = 0:L = 0
019010 IF I > 1 THEN JMP85
019020 T4 = T4 + 4
019030 IF J > 2 THEN JMP85
019040 T4 = T4 + 2
019050 JMP85:T2 = T4
019060 T3 = INT(T10+1)
019070 T4 = T4/12
019080 A = (T3- T10)*(1 - RO(T3))                    /*FIND FIRST H */
019090 H = IO*(1-A)
019100 A = (T3 - (T10+T4))*(1 -RO(T3))               /*FIND NEW IO */
019110 IO = H/(1-A)
019120 IF T4 <= T3 - T10 THEN JMP86
019130 L = L + 1
019140 A = (T10 + T4 - T3)*(1 - RO(T3 + L))
019150 IO = H*(1-A)
019160 H = H*RO(T3+L)
019170 A = ((T3+L)-(T10+T4))*(1-RO(T3+L))
019180 JMP86:K2 = ((IO + H)/2)*((T3+L)-(T10+T4))
019190 IF K2 > D5 THEN JMP87
019200 T2 = T2 + ((T3 + L) - (T10 + T4))*12
019210 JMP88:D5 = D5 - K2
019220 L = L + 1
019230 IO = H
019240 H = H*RO(T3+L)
```

```
019250 K2 = (I0 + M)/2
019260 IF K2 > D5 THEN JMP87
019270 T2 = T2 + 12
019280 GOTO JMP88
019290 JMP87:B = 2/(1-RO(T3+L))                    /*  D2 > D5  */
019300 C = ((1+RO(T3+L))/(1-RO(T3+L)))*(D5/K2)     /*B,C = QUADRATIC CO*/
019310 T = (B - SQR(B^2 - 4*C))/2
019320 T2 = T2 + T*12
019330 RETURN
019340 ************************************************************
019350 *                                                          *
019360 *       #57 - GIVEN THE REQUIREMENT A, TOUR LENGTH T2,     *
019370 *             START TIME T1, AND DESTINATION I,J FIND      *
019380 *             THE INPUT I0.                                *
019390 *                                                          *
019400 ************************************************************
019410 DEFFN' 57(T1,T2,A,I,J)
019420 T10 = T1/12
019430 T4 = 1
019440 IF I > 1 THEN JMP190
019450 T4 = T4 + 4
019460 IF J > 2 THEN JMP190
019470 T4 = T4 + 2
019480 JMP190:T1 = T1 + T4
019490 T2 = T2 - T4
019500 GOSUB' 51(T1,T2)
019510 F1 = (2*A)/R9
019520 T3 = INT(T1/12 + 1)
019530 B = (T3-T1/12)*(1-RO(T3))
019540 M = F1*(1-B)
019550 B = (T3-T10)*(1-RO(T3))
019560 I0 = M/(1-B)
019570 T1 = T1 - T4
019580 T2 = T2 + T4
019590 RETURN
019600 ************************************************************
019610 *                                                          *
019620 *     #58 - THIS SUBROUTINE CREATES THE SOURCE             *
019630 *           ALLOCATION MATRIX A2 GIVEN THE DESTINATION     *
019640 *           NODE (J) AND THE REQUIREMENTS INDEX (S10)      *
019650 *                                                          *
019660 ************************************************************
019670 DEFFN' 58(J,S10)
019680 K1 = 0:K2 = 0
019690 FOR P = 1 TO 7
019700 FOR Q = 1 TO 7
019710 A2(P,Q) = 0
019720 NEXT Q
019730 NEXT P
019740 FOR P = 1 TO 7
019750 K2 = 0
019760 FOR Q = 1 TO 6
```

```
019770 IF D0(Q,S10) <= 0 THEN JMP76
019780 IF STR(T9$(Q,J),3*P,3) = "KNN" THEN JMP76
019790 T8(Q) = D0(Q,S10)
019800 K2 = K2 + T8(Q)
019810 GOTO JMP77
019820 JMP76:T8(Q) = 0
019830 JMP77:NEXT Q
019840 IF K2 = 0 THEN JMP79
019850 FOR R = 1 TO 6
019860 T8(R) = T8(R)/K2
019870 NEXT R
019880 FOR Q = 1 TO 6
019890 IF T8(Q) > 0 THEN JMP70
019900 T8(Q) = 0
019910 JMP70:A2(P,Q) = T8(Q)
019920 NEXT Q
019930 JMP79:NEXT P
019940 RETURN
019950 ************************************************************
019960 *                                                          *
019970 *     #59 - THIS SUBROUTINE PRODUCES OUTPUTS IN RESPONSE   *
019980 *           TO ADAPTIVE INPUTS AT TERMINAL WHEN IN         *
019990 *           MONITORING MODE.                               *
020000 *                                                          *
020010 ************************************************************
020020 DEFFN' 59(X$)
020030 FOR Q = 1 TO 4
020040 D9(Q) = 0
020050 FOR P = 1 TO 7
020060 D9(Q) = D9(Q) + D0(P,Q)
020070 NEXT P
020080 D9(Q) = (D8(Q) - D9(Q))/D8(Q)
020090 NEXT Q
020100 D10 = 0
020110 FOR P = 1 TO 7
020120 D10 = D10 + INVT(P,1)
020130 NEXT P
020140 P9 = INT((79-P5-P6-25)/2)
020150 P10 = INT((79-LEN(X$))/2)
020160 STR(D$,1,2) = STR(DATE,3,2)
020170 STR(D$,3,1) = "/"
020180 STR(D$,4,2) = STR(DATE,5,2)
020190 STR(D$,6,1) = "/"
020200 STR(D$,7,2) = STR(DATE,1,2)
020210 STR(T$,1,2) = STR(TIME,1,2)
020220 STR(T$,3,1) = ":"
020230 STR(T$,4,2) = STR(TIME,3,2)
020240 JMP501:INIT(HEX(20))P1$(1)
020250 STR(P1$(1),1,10) = "WORKING ON"
020260 STR(P1$(1),12,P5) = A$
020270 STR(P1$(1),13+P5,2) = "IN"
020280 STR(P1$(1),16+P5,P6) = TYPE$(Q11)
```

```
020290 STR(P1$(1),17+P5+P6,9) = "COMMUNITY"
020300 ACCEPT AT(5,P9),FAC(HEX(8C)),P1$(1),
020310              AT(7,P10),FAC(HEX(8C)),X$,AT(7,54),FAC(HEX(8C)),
020320                        D$,AT(8,54),FAC(HEX(8C)),T$,
020330              AT(10,20),"FRACTION OF FILL",
020340              AT(11,15),"SENIOR COMMANDERS",AT(11,35),
020350                        FAC(HEX(8C)),D9(4),PIC(##.###),
020360              AT(12,15),"COMMANDERS",AT(12,35),FAC(HEX(8C)),
020370                        D9(3),PIC(##.###),
020380              AT(13,15),"LT. COMMANDERS",AT(13,35),FAC(HEX(8C)),
020390                        D9(2),PIC(##.###),
020400              AT(14,15),"LT. AND BELOW",AT(14,35),FAC(HEX(8C)),
020410                        D9(1),PIC(##.###),
020420              AT(15,15),"=======================",
020430              AT(17,10),"ACCESSIONS",AT(17,39),FAC(HEX(8C)),D10,
020440                        PIC(###.##),
020450              AT(18,10),"FIRST TOUR LENGTH",AT(18,39),
020460              FAC(HEX(8C)),T11,PIC(###.##),
020470              AT(20,10),"OUTPUT OPTIONS. PRESS PF KEY:",
020480              AT(21,15),"1. NODE FLOWS",AT(21,32),"2. INVENTORY",
020490                        AT(21,54),"3. REQUIREMENTS",
020500              AT(22,15),"4. EXCESS FLOW",
020510              AT(23,10),"FOR SCREEN PRINTS PRESS PF-11",
020520              AT(24,10),"PRESS ENTER TO CONTINUE PROGRAM",
020530 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(11)&BIN(12)),
020540 ON(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(11)&BIN(12))
020550 GOTO JMP401,JMP402,JMP403,JMP404,JMP405,JMP5101,JMP5100
020560 JMP5101:N = 1
020570 GOSUB' 71(N)
020580 GOTO JMP501
020590 JMP5100:GOSUB' 73
020600 GOTO JMP501
020610 JMP402:/*OUTPUT MATRIX I4*/
020620 FOR P = 1 TO 7
020630 INIT(HEX(20))P1$(P)
020640 FOR R = 1 TO 7
020650 CONVERT I4(P,R) TO STR(P1$(P),7*R-6,6),PIC(###.##)
020660 NEXT R
020670 NEXT P
020680 ACCEPT AT(5,32),"NODE FLOW VALUES",
020690        AT(7,34),"YOUR NUMBERS",
020700        AT(9,8),"ACTIVITY",
020710        AT(9,29),"ONE", AT(9,36),"TWO",AT(9,42),"THREE",
020720        AT(9,49),"FOUR",AT(9,56),"FIVE",AT(9,64),"SIX",
020730        AT(9,70),"SEVEN",
020740        AT(11,2),FAC(HEX(8C)),LABEL$(1),AT(11,27),FAC(HEX(8C)),
020750                 P1$(1),CH(49),
020760        AT(12,2),FAC(HEX(8C)),LABEL$(2),AT(12,27),FAC(HEX(8C)),
020770                 P1$(2),CH(49),
020780        AT(13,2),FAC(HEX(8C)),LABEL$(3),AT(13,27),FAC(HEX(8C)),
020790                 P1$(3),CH(49),
020800        AT(14,2),FAC(HEX(8C)),LABEL$(4),AT(14,27),FAC(HEX(8C)),
```

```
020810                  P1$(4),CH(49),
020820        AT(15,2),FAC(HEX(8C)),LABEL$(5),AT(15,27),FAC(HEX(3C)),
020830                  P1$(5),CH(49),
020840        AT(16,2),FAC(HEX(8C)),LABEL$(6),AT(16,27),FAC(HEX(3C)),
020850                  P1$(6),CH(49),
020860        AT(17,2),FAC(HEX(8C)),LABEL$(7),AT(17,27),FAC(HEX(8C)),
020870                  P1$(7),CH(49),
020880        AT(19,5),"**********************************************
020890 **********",
020900        AT(22,10),"PRESS ENTER TO RETURN TO OUTPUT MENU",
020910                  KEYS(BIN(0)&BIN(11)),ON (BIN(0)&BIN(11)) GOTO
020920                  JMP501,JMP5102
020930 JMP5102:N = 2
020940 GOSUB' 71(N)
020950 GOTO JMP501
020960 JMP403:/*OUTPUT SELECTED INVENTORY ENTRIES*/
020970 ACCEPT AT(5,32),"INVENTORY DISPLAY",
020980        AT(7,10),"SELECT FOUR YEARS FOR OUTPUT BETWEEN 1 AND 30",
020990        AT(10,15),"FIRST YEAR",AT(10,30),T15(1),
021000                  PIC(##),
021010        AT(12,15),"SECOND YEAR",AT(12,30),T15(2),
021020                  PIC(##),
021030        AT(14,15),"THIRD YEAR",AT(14,30),T15(3),
021040                  PIC(##),
021050        AT(16,15),"FOURTH YEAR",AT(16,30),T15(4),
021060                  PIC(##),
021070        AT(21,10),"PRESS PF2 TO RETURN TO OUTPUT MENU",
021080        AT(23,10),"PRESS PF1 TO CONTINUE",
021090 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(11)),ON(BIN(1)&BIN(2)&BIN(11)) GOTO
021100 JMP502,JMP501,JMP5103
021110 GOTO JMP502
021120 JMP5103:N = 3
021130 GOSUB' 71(N)
021140 GOTO JMP501
021150 JMP502:/*CREATE AND DISPLAY INVT SELECTION*/
021160 FOR P = 1 TO 9
021170 INIT(HEX(20))P1$(P)
021180 STR(P1$(P),1,24) = LABEL$(P)
021190 FOR R = 1 TO 4
021200 CONVERT INVT(P,T15(R)) TO STR(P1$(P),18+9*R,6),PIC(###.##)
021210 NEXT R
021220 NEXT P
021230 ACCEPT AT(3,32),"INVENTORY DISPLAY",
021240        AT(7,33),"YEARS",
021250        AT(8,16),"ACTIVITY",AT(8,33),FAC(HEX(8C)),T15(1),PIC(##),
021260        AT(8,47),FAC(HEX(8C)),T15(2),PIC(##),AT(8,56),FAC(HEX(3C))
021270          ,T15(3),PIC(###),AT(8,65),FAC(HEX(8C)),T15(4),PIC(##),
021280        AT(10,8),FAC(HEX(8C)),P1$(1),
021290        AT(11,8),FAC(HEX(8C)),P1$(2),
021300        AT(12,8),FAC(HEX(8C)),P1$(3),
021310        AT(13,8),FAC(HEX(8C)),P1$(4),
021320        AT(14,8),FAC(HEX(8C)),P1$(5),
```

```
021330          AT(15,8),FAC(HEX(8C)),P1$(6),
021340          AT(16,3),FAC(HEX(8C)),P1$(7),
021350          AT(17,8),FAC(HEX(8C)),P1$(8),
021360          AT(19,5),"**************************************************
021370 **********************",
021380          AT(21,8),FAC(HEX(8C)),P1$(9),
021390          AT(23,5),"**************************************************
021400 **********************",
021410          AT(24,10),"PRESS ENTER TO RETURN TO OUTPUT MENU",
021420 KEYS(BIN(0)&BIN(11)),ON (BIN(0)&BIN(11)) GOTO JMP501,JMP5104
021430 JMP5104:GOSUB' 71(4)
021440 GOTO JMP501
021450 JMP404:/*DISPLAY REQUIREMENTS MATRIX*/
021460 FOR P = 1 TO 7
021470 INIT(HEX(20))P1$(P)
021480 STR(P1$(P),1,24) = LABEL$(P)
021490 FOR R = 1 TO 4
021500 CONVERT D0(P,R) TO STR(P1$(P),18+9*R,7),PIC(####.##)
021510 NEXT R
021520 NEXT P
021530 INIT(HEX(20))P1$(8)
021540 STR(P1$(8),1,24) = "LOWER GRADE FILLS"
021550 FOR R = 1 TO 3
021560 CONVERT Q37(R) TO STR(P1$(8),27+9*R,7),PIC(####.##)
021570 NEXT R
021580 ACCEPT AT(3,31),"REQUIREMENTS DISPLAY",
021590          AT(7,36),"CATEGORY",
021600          AT(8,16),"ACTIVITY",AT(8,37),"LT",AT(8,46),"LCDR",
021610          AT(8,55),"CDR",AT(8,64),"CDR+",
021620          AT(10,8),FAC(HEX(8C)),P1$(1),
021630          AT(11,8),FAC(HEX(8C)),P1$(2),
021640          AT(12,8),FAC(HEX(8C)),P1$(3),
021650          AT(13,8),FAC(HEX(8C)),P1$(4),
021660          AT(14,8),FAC(HEX(8C)),P1$(5),
021670          AT(15,8),FAC(HEX(8C)),P1$(6),
021680          AT(16,8),FAC(HEX(8C)),P1$(7),
021690          AT(18,5),"**************************************************
021700 **********************",
021710          AT(20,8),FAC(HEX(8C)),P1$(8),
021720          AT(22,5),"**************************************************
021730 **********************",
021740          AT(24,10),"PRESS ENTER TO RETURN TO OUTPUT MENU",
021750 KEYS(BIN(0)&BIN(11)), ON (BIN(0)&BIN(11)) GOTO JMP501,JMP5105
021760 JMP5105:GOSUB' 71(5)
021770 GOTO JMP501
021780 JMP405:/*DISPLAY SURPLUS FLOWS (Q7) */
021790 FOR P = 1 TO 3
021800 INIT(HEX(20))P1$(P)
021810 STR(P1$(P),1,24) = LABEL$(P)
021820 FOR R = 1 TO 7
021830 CONVERT ROUND(Q7(P,R),1) TO STR(P1$(P),21+6*R,5),PIC(###.#)
021840 NEXT R
```

```
021850 NEXT P
021860 STR(P1$(5),1,24) = "NON-AVIATION MAN-YEARS"
021870 FOR R = 1 TO 7
021880 CONVERT ROUND(OUTA(R),1) TO STR(P1$(8),21+6*R,5),PIC(###.#)
021890 NEXT R
021900 ACCEPT AT(3,28),"SURPLUS FLOW (Q7) DISPLAY",                          !
021910        AT(7,38),"TOUR",                                              !
021920        AT(8,15),"ACTIVITY",AT(8,37),"1",AT(8,43),"2",AT(8,49),       !
021930        "3",AT(8,55),"4",AT(8,61),"5",AT(8,67),"6",AT(8,73),"7",      !
021940        AT(10,8),FAC(HEX(8C)),P1$(1),                                 !
021950        AT(11,8),FAC(HEX(8C)),P1$(2),                                 !
021960        AT(12,8),FAC(HEX(8C)),P1$(3),                                 !
021970        AT(13,8),FAC(HEX(8C)),P1$(4),                                 !
021980        AT(14,8),FAC(HEX(8C)),P1$(5),                                 !
021990        AT(15,8),FAC(HEX(8C)),P1$(6),                                 !
022000        AT(16,8),FAC(HEX(8C)),P1$(7),                                 !
022010        AT(18,5),"**************************************************!
022020 **********",                                                         !
022030        AT(20,8),FAC(HEX(8C)),P1$(8),                                 !
022040        AT(22,5),"**************************************************!
022050 **********",                                                         !
022060        AT(24,10),"PRESS ENTER TO RETURN TO OUTPUT MENU",             !
022070 KEYS(BIN(0)&BIN(T1)),ON (BIN(0)&BIN(T1)) GOTO JMP501,JMP5106
022080 JMP5106:GOSUB' 71(6)
022090 GOTO JMP501
022100 JMP401:GOSUB' 63
022110 RETURN
022120 ************************************************************
022130 *                                                          *
022140 *     #60 - THIS SUBROUTINE ASSIGNS THE CORRECT FLOW       *
022150 *           TO PG SCHOOL AT T1 FOR COURSE LENGTH T2        *
022160 *           WITH FLEET TOUR OUTPUT P1                      *
022170 *                                                          *
022180 ************************************************************
022190 DEFFN' 60(T1,T2,P1,J)
022200 T3 = T1/12
022210 T4 = INT(T3+1)
022220 T20 = T2/12
022230 C = 0:C2 = 0:L = 1
022240 T8(1) = P1*(T4-T3)
022250 T20 = T20 - (T4-T3)
022260 L = L + 1
022270 C2 = C2 + T8(1)
022280 C = C2 - C2/(T2*(T4-T3))
022290 JMP706:IF T20 < 1 THEN JMP705
022300 T8(L) = P1
022310 T20 = T20 - 1
022320 C = C + T8(L)
022330 C2 = C2 + T8(L)
022340 L = L + 1
022350 GOTO JMP706
022360 JMP705:T8(L) = P1*T20
```

```
022370 C = C + T8(L)
022380 C2 = C2 + T3(L)
022390 FOR K = 1 TO L
022400 INVT(6,T4-1+K) = INVT(6,T4-1+K) + T8(K)
022410 INVT(8,T4-1+K) = INVT(8,T4-1+K) - T8(K)
022420 NEXT K
022430 DO(6,1) = DO(6,1) - C
022440 K2 = P1
022450 K3 = C2
022460 K4 = C
022470 T20 = T2/T2
022480 FOR K = 1 TO L
022490 T6(K) = T8(K)
022500 NEXT K
022510 T4 = INT(T3+T20+1)
022520 B1 = (T3+T20-(INT(T3+T20)))*(1-RO(T4))
022530 H = P1/(1-B1)
022540 T20 = T20 -(T3+T20-INT(T3+T20))
022550 JMP937:IF T20 < 1 THEN JMP936
022560 T20 = T20 - 1
022570 T4 = T4 - 1
022580 H = H/RO(T4)
022590 GOTO JMP937
022600 JMP936:T4 = T4 - 1
022610 B1 = T20*(1-RO(T4))
022620 H = H/(1-B1)
022630 K6 = H
022640 GOSUB' 55(T1,T2,H,6,J)
022650 T4 = INT(T1/T2+1)
022660 K4 = C - K4
022670 Q8 = 1
022680 Q6 = 273
022690 K5 = 0:K1 = 2
022700 IF T1 < 56 THEN JMP943
022710 K1 = K1 + 1
022720 JMP943:IF K1 < 3 THEN JMP946
022730 Q6 = 0
022740 JMP946:IF K4 <= (DO(3,1)+DO(2,1)) THEN JMP938
022750 K5 = K4 - (DO(3,1)+DO(2,1))
022760 Q8 = (DO(3,1)+DO(2,1))/K4
022770 JMP938:IF Q6*K4 > DO(3,1) THEN JMP939
022780 IF (1-Q6)*K4 > DO(2,1) THEN JMP939
022790 GOTO JMP941
022800 JMP939:IF K1 >= 3 THEN JMP941
022810 Q6 = DO(3,1)/(DO(3,1)+CO(2,1))
022820 JMP941:FOR K = 1 TO L
022830 INVT(3,T4-1+K) = INVT(3,T4-1+K) + (T8(K+1)-T6(K))*Q6*Q8
022840 INVT(2,T4-1+K) = INVT(2,T4-1+K) + (T8(K+1)-T6(K))*(1-Q6)*Q8
022850 INVT(8,T4-1+K) = INVT(8,T4-1+K) - (T8(K+1)-T6(K))*Q8
022860 IF K5 <= 0 THEN JMP942
022870 INVT(7,T4-1+K) = INVT(7,T4-1+K) + (T8(K+1)-T6(K))*(1-Q8)
022880 INVT(3,T4-1+K) = INVT(8,T4-1+K) - (T8(K+1)-T6(K))*(1-Q8)
```

```
022890 JMP942:NEXT K
022900 IF STR(T9$(2,K1),3,3) = "NNN" THEN JMP963
022910 CONVERT STR(T9$(2,K1),3,3) TO D2
022920 D2 = INT(D2+Q8*(1-Q6)*(C2-K3+.5))
022930 CONVERT D2 TO STR(T9$(2,K1),3,3),PIC(###)
022940 D0(2,1) = D0(2,1) - K4*(1-Q6)*Q8
022950 JMP963:IF STR(T9$(3,K1),3,3) = "NNN" THEN JMP964
022960 CONVERT STR(T9$(3,K1),3,3) TO D2
022970 D2 = INT(D2+Q8*Q6*(C2-K3+.5))
022980 CONVERT D2 TO STR(T9$(3,K1),3,3),PIC(###)
022990 D0(3,1) = D0(3,1) - K4*Q8*Q6
023000 JMP964:IF STR(T9$(7,K1),3,3) = "NNN" THEN JMP944
023010 IF K5 <= 0 THEN JMP944
023020 CONVERT STR(T9$(7,K1),3,3) TO D2
023030 D2 = INT(D2+(1-Q8)*(C2-K3)+.5)
023040 CONVERT D2 TO STR(T9$(7,K1),3,3),PIC(###)
023050 D0(7,1) = D0(7,1) - K5
023060 JMP944:I2 = K2
023070 C2 = K3
023080 RETURN
023090 ************************************************************************
023100 *                                                                      *
023110 *     #61 = THIS SUBROUTINE CHECKS INPUT DISTRIBUTION                  *
023120 *           AGAINST INVENTORY AND ADJUSTS TO STAY                      *
023130 *           WITHIN LIMITS. NEEDS START TIME T1, I, J,                  *
023140 *           AND S10.                                                   *
023150 *                                                                      *
023160 ************************************************************************
023170 DEFFN' 61(T1,T2,I0,N,I,J,S10)
023180 L = T8(1)
023190 Q6 = 1
023200 Q3 = I0
023210 FOR R = 1 TO L
023220 T8(R) = T8(R+1)
023230 NEXT R
023240 T8(L+1) = 0
023250 IF I = 9 THEN JMP755
023260 IF C <= D0(I,S10) THEN JMP755
023270 Q6 = D0(I,S10)/C
023280 FOR R = 1 TO L
023290 T8(R) = Q6*T8(R)
023300 NEXT R
023310 C = C*Q6
023320 C2 = C2*Q6
023330 I2 = I2*Q6
023340 Q8 = Q8*Q6
023350 JMP755:FOR R = 1 TO L
023360 IF T8(R) = 0 THEN JMP753
023370 IF T8(R) <= INVT(8,INT(T1/12)+R) THEN JMP753
023380 Q6 = (INVT(8,INT(T1/12)+R))/T8(R)
023390 FOR P = 1 TO L
023400 T8(P) = T8(P)*Q6
```

```
023410 NEXT P
023420 C = C*Q5
023430 C2 = C2*Q6
023440 I2 = I2*Q6
023450 Q8 = Q8*Q6
023460 JMP753:NEXT R
023470 L1 = INT(T1/12+1)
023480 FOR R = L1 TO L1+L-1
023490 INVT(I,R) = INVT(I,R) + T3(R-L1+1)
023500 INVT(8,R) = INVT(8,R) - T3(R-L1+1)
023510 NEXT R
023520 IF I = 9 THEN JMP777
023530 I4(I,J) = I4(I,J) + I2
023540 D0(I,S10) = D0(I,S10) - C
023550 JMP777:DLT = I0 - C8
023560 RETURN
023570 ************************************************************
023580 *                                                          *
023590 *     #62 - THIS SUBROUTINE ADJUSTS FLOWS TO LIMIT         *
023600 *           INPUTS, FLOWS AND OUTPUTS TO VALUES            *
023610 *           CONSISTENT WITH REQUIREMENTS IN THE FACE       *
023620 *           OF A FIXED TOUR LENGTH REQUIREMENT. NFEA'S     *
023630 *           ARE CREATED.                                   *
023640 *                                                          *
023650 ************************************************************
023660 DEFFN' 62(C,D5,J)
023670 Q6 = D5/C
023680 C = Q6*C
023690 C2 = Q6*C2
023700 FOR K = 2 TO 12
023710 T8(K) = T8(K)*Q6
023720 NEXT K
023730 I2 = I2*Q6
023740 IF J>1 THEN JMP947
023750 D3 = D3 + INVT0(31)*P0(1)
023760 RETURN
023770 JMP947:P1 = P1 + D3*(1-Q6)
023780 NFEA = NFEA + D3*(1-Q6)
023790 RETURN
023800 ************************************************************
023810 *                                                          *
023820 *     #63 - THIS SUBROUTINE IS USED TO CLEAR THE SCREEN    *
023830 *           AND RESET FOR PERIODS WHEN THE PROGRAM IS      *
023840 *           RUNNING.                                       *
023850 *                                                          *
023860 ************************************************************
023870 DEFFN' 63
023880 INIT(HEX(20))P1$(1)
023890 STR(P1$(1),1,P5) = A$
023900 STR(P1$(1),P5+2,2) = "IN"
023910 STR(P1$(1),P5+5,P6) = TYPE$(Q11)
023920 STR(P1$(1),P5+P6+6,9) = "COMMUNITY"
```

```
023930 DISPLAY AT(10,30),"EXECUTION CONTINUES",
023940         AT(12,35),"WORKING ON",
023950         AT(14,20),P1$(1),CH(60),
023960         AT(21,50),"MAIN ITERATION",AT(21,69),T50,PIC(##),
023970         AT(22,50),"'OTHER' ITERATION",AT(22,69),T51,PIC(##)
023980 RETURN
023990 ********************************************************************
024000 *                                                                  *
024010 *     #64 - THIS SUBROUTINE ADJUSTS THE CONTINUATION               *
024020 *           VECTOR IN RESPONSE TO RETENTION (R), MSR (A),          *
024030 *           RETENTION POINT (B), AND CAREER STABLE                 *
024040 *           POINT (C).                                             *
024050 *                                                                  *
024060 ********************************************************************
024070 DEFFN' 64(R,A,B,C)
024080 GOSUB' 84
024090 E = SQR(R/RO(1))
024100 FOR P = A+1 TO B
024110 RO(P) = E
024120 NEXT P
024130 E = .924*(((.45+R)/(2*R))**.12)
024140 FOR P = B+1 TO C
024150 RO(P) = E
024160 NEXT P
024170 RO2 = R
024180 RETURN
024190 ********************************************************************
024200 *                                                                  *
024210 *     #65 - THIS SUBROUTINE RECOMPUTES THE VALUE OF TOUR           *
024220 *           END TIME T1 BASED ON ACTUAL FLOW VALUES.               *
024230 *                                                                  *
024240 ********************************************************************
024250 DEFFN' 65(J)
024260 FOR I = 1 TO 7
024270 D2 = 0:T18(8) = 0
024280 FOR N = 1 TO 7
024290 IF STR(T9$(I,J),3*N,3) = "NNN" THEN JMP778
024300 CONVERT STR(T9$(I,J),3*N,3) TO T18(N)
024310 IF T18(N) = 0 THEN JMP778
024320 CONVERT STR(T9$(N,J-1),24,3) TO T1
024330 D2 = D2 + T18(N)
024340 T18(8) = T18(8) + T18(N)*T1
024350 JMP778:NEXT N
024360 IF D2 = 0 THEN JMP779
024370 T1 = T18(8)/D2
024380 CONVERT STR(T9$(I,J),1,2) TO T2
024390 CONVERT INT(T1+T2+.5) TO STR(T9$(I,J),24,3),PIC(###)
024400 JMP779:NEXT I
024410 RETURN
024420 ********************************************************************
024430 *                                                                  *
024440 *     #66 - THIS SUBROUTINE IMPLEMENTS UPWARD DETAILING            *
```

```
024450 *           WHEN LOWER GRADE REQUIREMENTS ARE ALL MET.          *
024460 *           SOURCE N, YOUR J, PERSONNEL ARE WORKED AGAINST      *
024470 *           REQUIREMENT S+1.  OUTPUTS APPEAR IN T17().          *
024480 *                                                               *
024490 *****************************************************************
024500 DEFFN' 66(N,J,S)
024510 S10 = S+1
024520 IF S<4 THEN JMP3062
024530 S10 = 3
024540 JMP3062:GOSUB' 58(J,S10)
024550 FOR P = 1 TO 7
024560 T5(P) = 0
024570 D3 = 0:D4 = 0
024580 FOR Q = 1 TO 3
024590 D4 = D4 + A2(P,Q)
024600 NEXT Q
024610 FOR Q = 4 TO 7
024620 D3 = D3 + A2(P,Q)
024630 NEXT Q
024640 IF D3 = 0 THEN JMP1111
024650 FOR Q = 4 TO 7
024660 A2(P,Q) = A2(P,Q) + D4*(A2(P,Q)/D3)
024670 NEXT Q
024680 JMP1111:A2(P,1),A2(P,2),A2(P,3) = 0
024690 NEXT P
024700 CONVERT STR(T9$(N,J-1),24,3) TO T1
024710 FOR K = 4 TO 7
024720 T5(K) = A2(N,K)*Q7(N,J-1)
024730 NEXT K
024740 T5(8) = 0
024750 FOR I = 4 TO 7
024760 IF T5(I) <= 0 THEN JMP3002
024770 IF STR(T9$(I,J),3*N,3) = "NNN" THEN JMP3002
024780 CONVERT STR(T9$(I,J),1,2) TO T2
024790 GOSUB' 55(T1,T2,T5(I),I,J)
024800 GOSUB' 61(T1,T2,T5(I),N,I,J,S10)
024810 CONVERT STR(T9$(I,J),3*N,3) TO D2
024820 D2 = D2 + INT(C2+.5)
024830 CONVERT D2 TO STR(T9$(I,J),3*N,3),PIC(###)
024840 IF S < 4 THEN JMP3063
024850 Q37(3) = Q37(3) + C
024860 GOTO JMP3064
024870 JMP3063:Q37(S10-1) = Q37(S10-1) + C
024880 JMP3064:T5(I) = DLT
024890 T17(I) = I2
024900 JMP3002:T5(I+1) = T5(I+1) + T5(I)
024910 NEXT I
024920 Q7(N,J-1) = T5(8)
024930 RETURN
024940 *****************************************************************
024950 *                                                               *
024960 *     #67 - THIS SUBROUTINE RESETS ALL VARIABLES AND            *
```

```
024970 *          VARIABLE ARRAYS IN PREPARATION FOR A NEW          *
024980 *          ITERATION.                                        *
024990 *                                                            *
025000 ************************************************************
025010 DEFFN' 67
025020 FOR P = 1 TO 7
025030 FOR Q = 1 TO 4
025040 DD(P,Q) = Q4(P,Q)
025050 NEXT Q
025060 FOR Q = 1 TO 31
025070 INVT(8,Q) = INVT(8,Q) + INVT(P,Q)
025080 INVT(P,Q) = 0
025090 NEXT Q
025100 NEXT P
025110 FOR Q = 1 TO 31
025120 INVT(8,Q) = INVT(8,Q) + INVT(9,Q)
025130 INVT(9,Q) = 0
025140 INVTO(Q) = INVT(8,Q)
025150 NEXT Q
025160 FOR Q = 1 TO 4
025170 Q37(Q) = 0
025180 NEXT Q
025190 FOR P = 1 TO 8
025200 OUTA(P) = 0
025210 NEXT P
025220 FOR Q = 1 TO 7
025230 FOR P = 1 TO 7
025240 I4(P,Q) = 0
025250 Q7(P,Q) = 0
025260 FOR K = 1 TO 7
025270 IF STR(T9$(P,Q),3*K,3) = "NNN" THEN JMP899
025280 STR(T9$(P,Q),3*K,3) = "000"
025290 JMP899:NEXT K
025300 NEXT P
025310 NEXT Q
025320 FOR P = 1 TO 12
025330 T5(P),T6(P),T7(P),T8(P),T15(P),T17(P),T18(P) = 0
025340 NEXT P
025350 Q10 = 0
025360 RETURN
025370 ************************************************************
025380 *                                                            *
025390 *     #68 - THIS SUBROUTINE SWEEPS UP REMAINING INVT         *
025400 *           AND FLOWS IT TO APPROPRIATE REQUIREMENT AT       *
025410 *           END OF EACH TOUR ITERATION.                      *
025420 *                                                            *
025430 ************************************************************
025440 DEFFN' 68(J,S)
025450 IF J < 7 THEN JMP3097
025460 CONVERT STR(T9$(7,7),24,3) TO T1
025470 GOTO JMP3098
025480 JMP3097:CONVERT STR(T9$(1,J),24,3) TO T1
```

```
025490 FOR K = 2 TO 7
025500 CONVERT STR(T9$(K,J),24,3) TO T2
025510 IF T2 >= T1 THEN JMP3087
025520 T1 = T2
025530 JMP3087:NEXT K
025540 JMP3098:FOR K = 1 TO INT(T1/12)
025550 IF INVT(8,K) = 0 THEN JMP3099          /* OUT K */
025560 S2 = 0
025570 IF K < 10 THEN S1 = 1
025580 IF K > 9 THEN S1 = 2
025590 IF K > 15 THEN S1 = 3
025600 IF K > 18 THEN S1 = 4
025610 FOR L = 2 TO 7
025620 IF DO(L,S1) <= 0 THEN JMP3095          /* OUT L */
025630 IF DO(L,S1) < INVT(8,K) THEN JMP3093
025640 DO(L,S1) = DO(L,S1) - INVT(8,K)
025650 S2 = INVT(8,K)
025660 GOTO JMP3094
025670 JMP3093:S2 = DO(L,S1)
025680 DO(L,S1) = 0
025690 JMP3094:INVT(8,K) = INVT(8,K) - S2
025700 INVT(L,K) = INVT(L,K) + S2
025710 CONVERT STR(T9$(L,J),1,2) TO T2
025720 T2 = INT((T1/12)-(T2/24))
025730 FOR N = T2 TO INT(T1/12)
025740 S2 = S2*RO(N)
025750 NEXT N
025760 T7(L) = T7(L) + S2
025770 S2 = 0
025780 JMP3095:IF INVT(8,K) = 0 THEN L = 7
025790 NEXT L
025800 IF INVT(8,K) = 0 THEN JMP3099
025810 IF Z3$ <> "YES" THEN JMP3092
025820 IF S1 = 4 THEN S1 = 3 ELSE S1 = S1 + 1
025830 FOR L = 2 TO 7
025840 IF DO(L,S1) <= 0 THEN JMP6095          /* OUT L */
025850 IF DO(L,S1) < INVT(8,K) THEN JMP6093
025860 DO(L,S1) = DO(L,S1) - INVT(8,K)
025870 S2 = INVT(8,K)
025880 GOTO JMP6094
025890 JMP6093:S2 = DO(L,S1)
025900 DO(L,S1) = 0
025910 JMP6094:INVT(8,K) = INVT(8,K) - S2
025920 INVT(L,K) = INVT(L,K) + S2
025930 CONVERT STR(T9$(L,J),1,2) TO T2
025940 T2 = INT((T1/12)-(T2/24))
025950 FOR N = T2 TO INT(T1/12)
025960 S2 = S2*RO(N)
025970 NEXT N
025980 T7(L) = T7(L) + S2
025990 S2 = 0
026000 JMP6095:IF INVT(8,K) = 0 THEN L = 7
```

```
026010 NEXT L
026020 JMP3092:IF INVT(8,K) = 0 THEN JMP3099
026030 S2 = INVT(8,K)
026040 INVT(9,K) = INVT(9,K) + S2
026050 INVT(8,K) = 0
026060 CONVERT STR(T9$(7,J),1,2) TO T2
026070 T2 = INT((T1/12)-(T2/24))
026080 FOR N = T2 TO INT(T1/12)
026090 S2 = S2*R0(N)
026100 NEXT N
026110 T7(7) = T7(7) + S2
026120 JMP3099:NEXT K
026130 RETURN
026140 ************************************************************
026150 *                                                          *
026160 *     #69 - THIS SUBROUTINE RESETS ALL VARIABLES AND       *
026170 *           VARIABLE ARRAYS IN PREPARATION FOR A NEW       *
026180 *           COMMUNITY RUN                                  *
026190 *                                                          *
026200 ************************************************************
026210 DEFFN' 69
026220 FOR I = 1 TO 7
026230 FOR J = 1 TO 4
026240 D0(I,J) = 0
026250 Q4(I,J) = 0
026260 NEXT J
026270 NEXT I
026280 FOR J = 1 TO 31
026290 INVT0(J) = 0
026300 FOR I = 1 TO 9
026310 INVT(I,J) = 0
026320 NEXT I
026330 NEXT J
026340 FOR J = 1 TO 4
026350 Q37(J) = 0
026360 NEXT J
026370 FOR I = 1 TO 8
026380 OUTA(I) = 0
026390 NEXT I
026400 FOR J = 1 TO 7
026410 FOR I = 1 TO 7
026420 I4(I,J) = 0
026430 Q7(I,J) = 0
026440 T9$(I,J) = T10$(I,J)
026450 NEXT I
026460 NEXT J
026470 FOR I = 1 TO 12
026480 T5(I),T6(I),T7(I),T8(I),T15(I),T17(I),T18(I)=0
026490 NEXT I
026500 STR(T9$(1,1),1,2) = "36"
026510 STR(T9$(1,2),1,2) = "36"
026520 Q1C = 0
```

```
026530 RETURN
026540 ************************************************************
026550 *                                                          *
026560 *     #80 - THIS SUBROUTINE COMPUTES THE VALUES OF         *
026570 *           VARIOUS OUTPUT VARIABLES FOR THE COMMUNITY     *
026580 *           BEING WORKED ON                                *
026590 *                                                          *
026600 ************************************************************
026610 DEFFN' 80
026620 D3 = 0
026630 FOR P = 1 TO 12
026640 T5(P) = 0
026650 T8(P) = 0
026660 NEXT P
026670 FOR P = 1 TO 9
026680 FOR Q = 1 TO 10
026690 T5(P) = T5(P) + INVT(P,Q)
026700 NEXT Q
026710 NEXT P
026720 FOR P = 1 TO 9
026730 T8(4) = T8(4) + T5(P)
026740 T5(P) = T5(P) + INVT(P,11)
026750 T8(5) = T8(5) + T5(P)
026760 NEXT P
026770 FOR P = 1 TO 4
026780 D3 = D3 + T5(P)
026790 NEXT P
026800 T8(5) = (D3/((6*T8(5))/11))
026810 FOR P = 1 TO 9
026820 FOR Q = 12 TO 15
026830 T5(P) = T5(P) + INVT(P,Q)
026840 NEXT Q
026850 NEXT P
026860 FOR P = 1 TO 9
026870 T8(3) = T8(3) + T5(P)
026880 NEXT P
026890 T8(3) = T8(3) - T8(4)
026900 CONVERT STR(T95(1,6),24,3) TO T1
026910 IF T1 < 216 THEN D30 = 18 ELSE D30 = INT((T1/12)+1)
026920 FOR P = 1 TO 9
026930 FOR Q = 16 TO D30
026940 T5(P) = T5(P) + INVT(P,Q)
026950 NEXT Q
026960 NEXT P
026970 FOR P = 1 TO 9
026980 T8(2) = T8(2) + T5(P)
026990 T8(6) = T8(6) + T5(P)
027000 NEXT P
027010 T8(2) = T8(2) - T8(3) - T8(4)
027020 D3 = 0
027030 FOR P = 1 TO 4
027040 D3 = D3 + T5(P)
```

```
027050 NEXT P
027060 D13 = T8(5)
027070 T8(6) = (D3/((11*T8(6))/13))
027080 T8(7) = (D3/((9*D13)/18))
027090 FOR P = 1 TO 9
027100 FOR Q = D30+1 TO 26
027110 T5(P) = T5(P) + INVT(P,Q)
027120 NEXT Q
027130 NEXT P
027140 FOR P = 1 TO 9
027150 T8(1) = T8(1) + T5(P)
027160 NEXT P
027170 T8(1) = T8(1) - T8(2) - T8(3) - T8(4)
027180 GOSUB' 81(4)
027190 T8(8) = D3/T5(1)
027200 GOSUB' 81(5)
027210 T8(8) = T8(8) + D3/T5(1)
027220 GOSUB' 81(6)
027230 T8(9) = D3/T5(1)
027240 FOR P = 1 TO 4
027250 T8(P) = ROUND(T8(P),0)
027260 NEXT P
027270 FOR P = 5 TO 9
027280 T8(P) = ROUND(T8(P),2)
027290 NEXT P
027320 GOSUB' 82(X3)
027330 RETURN
027340 ************************************************************
027350 *                                                          *
027360 *      #81 - THIS SUBROUTINE COMPUTES FLEET ASSIGNMENT     *
027370 *            OPPORTUNITY GIVEN THE TOUR NUMBER J.  THE     *
027380 *            RESULT IS RETURNED TO SR #80.                 *
027390 *                                                          *
027400 ************************************************************
027410 DEFFN' 81(J)
027420 CONVERT STR(T9$(1,J),24,3) TO T1
027430 CONVERT STR(T9$(1,J),1,2) TO T2
027440 T1 = T1 - T2:D3 = I4(1,J)
027450 FOR P = INT(((T1+T2)/12)+1) TO INT ((T1/12)+1) STEP -1
027460 D3 = D3/R0(P)
027470 NEXT P
027480 T5(1) = INVT(8,31)
027490 FOR P = 1 TO INT((T1/12)+1)
027500 T5(1) = T5(1)*R0(P)
027510 NEXT P
027520 RETURN
027530 ************************************************************
027540 *                                                          *
027550 *     #82 - THIS SUBROUTINE PROVIDES A DISPLAY OF THE      *
027560 *           OUTPUT DATA COMPUTED IN SR #30.                *
027570 *                                                          *
027580 ************************************************************
```

```
027590 DEFFN' 82(X$)
027600 P9 = INT((79-P5-P6-25)/2)
027610 P10 = INT((79-LEN(X$))/2)
027620 D3 = T8(1)+T8(2)+T8(3)+T8(4)
027621 X45 = ROUND(INV(T(8,3)),0):X46 = ROUND(T(11,0)
027630 STR(D$,1,2) = STR(DATE,3,2)
027640 STR(D$,3,1) = "/"
027650 STR(D$,4,2) = STR(DATE,5,2)
027660 STR(D$,6,1) = "/"
027670 STR(D$,7,2) = STR(DATE,1,2)
027680 STR(T$,1,2) = STR(TIME,1,2)
027690 STR(T$,3,1) = ":"
027700 STR(T$,4,2) = STR(TIME,3,2)
027710 INIT(HEX(20))P1$(1)
027720 STR(P1$(1),1,P5) = A$
027730 STR(P1$(1),2+P5,2) = "IN"
027740 STR(P1$(1),5+P5,P6) = TYPE$(QTY)
027750 STR(P1$(1),6+P5+P6,9) = "COMMUNITY"
027760 ACCEPT AT(5,P9),FAC(HEX(8C)),P1$(1),                              !
027770              AT(7,P10),FAC(HEX(8C)),X$,AT(7,54),FAC(HEX(3C)),    !
027780                        D$,AT(8,54),FAC(HEX(8C)),T$,               !
027790       AT(9,10),"COMMUNITY POPULATION",AT(9,45),"FLEET OPPORTUNIT!
027800 Y",                                                              !
027810       AT(10,7),"GRADE",AT(10,16),"NUMBER",                       !
027820       AT(11,5),"SENIOR CDR",AT(11,18),FAC(HEX(8C)),T8(1),        !
027830 PIC(####),                                                       !
027840       AT(12,5),"JUNIOR CDR",AT(12,18),FAC(HEX(3C)),T8(2),        !
027850 PIC(####),AT(12,40),"COMMAND OPPORTUNITY",AT(12,62),FAC(HEX(8C)),!
027860 T8(9),PIC(#.##),                                                 !
027870       AT(13,5),"LT. CDR",AT(13,18),FAC(HEX(8C)),T8(3),PIC(####),!
027880 AT(13,40),"DEPT HEAD OPPORTUNITY",AT(13,62),FAC(HEX(8C)),T8(8),  !
027890 PIC(#.##),                                                       !
027900     AT(14,5),"LIEUTENANT",AT(14,18),FAC(HEX(8C)),T8(4),PIC(####),!
027910       AT(16,5),"TOTAL",AT(16,18),FAC(HEX(8C)),D3,PIC(####),     !
027920       AT(17,5),"*************************************************!
027930 **********",                                                     !
027940       AT(18,50),"ACIP PROJECTION",                               !
027950       AT(19,5),"ACCESSIONS      ",AT(19,23),FAC(HEX(8C)),        !
027960       X45,PIC(####),AT(19,50),"GATE 1",AT(19,60),                !
027970       FAC(HEX(3C)),T8(5),PIC(#.##),                              !
027980       AT(20,50),"GATE 2",AT(20,60),FAC(HEX(8C)),T8(6),PIC(#.##),!
027990       AT(21,5),"FIRST TOUR LENGTH",AT(21,25),FAC(HEX(8C)),       !
028000       X46,PIC(##),AT(21,50),"GATE 3",AT(21,60),                  !
028010        FAC(HEX(8C)),T8(7),PIC(#.##),                             !
028020       AT(23,5),"DO YOU WISH TO CONTINUE IN-PROCESS MONITORING?",!
028030 AT(23,55),FAC(HEX(81)),Z1$,CH(3),AT(23,61),"(YES/NO)",           !
028040       AT(24,5),"PRESS ENTER TO CONTINUE",AT(24,35),"PRESS PF-1 T!
028050 O SUPPRESS PRINT",KEYS(BIN(0)&BIN(1)),KEY(PR)
028060 RETURN
028070 ************************************************************
028080 *                                                          *
028090 *     #83 - THIS SUBROUTINE SETS UP THE NETWORK MATRIX     *
```

```
028100 *           WITH THE CORRECT TOUR LENGTH AND TOUR END          *
028110 *           TIMES.                                             *
028120 *                                                              *
028130 ****************************************************************
028140 DEFFN' 83
028150 FOR J = 1 TO 7
028160 FOR I = 1 TO 7
028170 D1 = 1
028180 IF I > 1 THEN JMP12
028190 D1 = D1 + 4
028200 IF J > 2 THEN JMP12
028210 D1 = D1 + 2
028220 JMP12:CONVERT STR(T9$(I,J),1,2) TO T2
028230 IF T2 = 0 THEN JMP10
028240 T2 = T2 + D1
028250 CONVERT T2 TO STR(T9$(I,J),1,2),PIC(##)
028260 IF J > 1 THEN JMP11
028270 CONVERT T2 TO STR(T9$(I,J),24,3),PIC(###)
028280 GOTO JMP10
028290 JMP11:D1 = 0:D2 = 0:L = 0
028300 FOR K = 1 TO 7
028310 IF STR(T9$(I,J),3*K,3) = "NNN" THEN JMP112
028320 CONVERT STR(T9$(K,J-1),24,3) TO D2
028330 D1 = D1 + D2
028340 L = L + 1
028350 JMP112:NEXT K
028360 IF L = 0 THEN JMP10
028370 D1 = D1/L
028380 D1 = ROUND((D1+T2),0)
028390 CONVERT T2 TO STR(T9$(I,J),1,2),PIC(##)
028400 CONVERT D1 TO STR(T9$(I,J),24,3),PIC(###)
028410 JMP10:NEXT I
028420 NEXT J
028430 CONVERT STR(T9$(7,7),24,3) TO T1
028440 CONVERT STR(T9$(7,7),1,2) TO T2
028450 T2 = T2 + 312 - T1
028460 STR(T9$(7,7),24,3) = "312"
028470 STR(T9$(7,7),1,2) = "99"
028480 IF T2 > 99 THEN JMP5042
028490 CONVERT T2 TO STR(T9$(I,J),1,2),PIC(##)
028500 JMP5042:RETURN
028510 ****************************************************************
028520 *                                                              *
028530 *     #84 - THIS SUBROUTINE LOADS THE CONTINUATION VECTOR      *
028540 *           WITH ENTRIES REPRESENTING A RETENTION OF 45%.      *
028550 *           IT IS USED TO SET AND RESET THE VECTOR.            *
028560 *                                                              *
028570 ****************************************************************
028580 DEFFN' 84
028590 B32 = 1
028600 FOR I = 1 TO 7
028610 FOR J = B32 TO B32 + NG(I) - 1
```

```
028620 RO(J) = A50(I)
028630 NEXT J
028640 B32 = B32 + NO(I)
028650 NEXT I
028660 RO2 = .45
028670 RO3 = 5
028680 RO4 = 7
028690 RO5 = 11
028700 RETURN

*** End of Listing ***********************************************************
```

APPENDIX C

DEFAULT VALUES FOR MODEL VARIABLES

This appendix provides tabulations of all parameters of the Aviation Officer Requirements Model as they exist in the computer data base when the program is first called up. These are the default values to which the model is initially set. The operator can change any or all of these values for a particular run.

TABLE C1

GRADE STRUCTURE FLEET SQUADRONS
AND FLEET READINESS SQUADRON
(Grade Matrix GØ)

Subcommunity	FLEET SQUADRON						FLEET READINESS SQUADRON					
	Aviators			NFOs			Aviators			NFOs		
	05	04	03	05	04	03	05	04	03	05	04	03
Light Attack	2	4	11	0	0	0	8	23	85	0	0	0
Fighter	1	2	11	1	2	11	8	23	137	4	15	77
Medium Attack	1	2	13	1	2	13	2	5	44	2	6	31
Early Warning	1	2	7	1	2	12	2	6	34	2	5	33
Electronic Warfare	1	2	3	1	3	14	1	3	38	1	3	26
Carrier ASW	1	3	16	1	3	15	1	8	47	1	5	24
Helicopter ASW	2	4	14	0	0	0	4	17	57	0	0	0
Maritime Patrol	1	3	34	1	3	19	2	15	76	2	9	53
LAMPS MK I	2	4	14	0	0	0	4	17	51	0	0	0
LAMPS MK III	2	17	41	0	0	0	2	13	39	0	0	0
Electronic Warfare	0	0	0	0	0	0	0	0	0	0	0	0
Force Support Jet	0	0	0	0	0	0	0	0	0	0	0	0
Force Support Prop	0	0	0	0	0	0	0	0	0	0	0	0
Force Support Helo	1	3	1	0	0	0	0	0	0	0	0	0
Air Wing Staff	1	3	1	0	0	0	0	0	0	0	0	0

TABLE C-2

Squadron Structure
(Squadron Matrix S1)

Subcommunity	Number of Squadrons	Aircraft Per Squadron	Crew Factor	Pilots Per Crew	NFOs Per Crew
Light Attack	24	12	1.42	1	0
Fighter	24	12	1.17	1	1
Medium Attack	12	14	1.14	1	1
Early Warning	12	3	1.66	2	3
Electronic Warfare	9	4	1.5	1	3
Carrier ASW	11	9	1.44	1.5	1.5
Helicopter ASW	11	6	1.66	2	0
Maritime Patrol	24	9	1.33	3	2
LAMPS MK I	6	11	2	2	0
LAMPS MK II	8	15	2	2	0
Electronic Warfare	0	0	0	0	0
Force Support Jet	0	0	0	0	0
Force Support Prop	0	0	0	0	0
Force Support Helo	0	0	0	0	0
Air Wing Staff	12	0	0	0	0

TABLE C3

PIPELINE IDENTIFICATION
Allocation Parameters
(Allocation Matrix-A1)

Subcommunity	Pilot Pipe	NFO Pipe	Pilots			NFOs			
			Fraction of All Pilots	Fraction of Community Pilots	Fraction of Carrier Pilots	Fraction of All NFOs	Fraction of Community NFOs	Fraction of Carrier NFOs	Fraction of All Aviation Officers
Light Attack	1	0	.1068	.2617	.2690	0	0	0	.0729
Fighter	1	4	.0838	.2053	.2110	.1797	1.0	.3101	.1142
Medium Attack	1	5	.0475	.1163	.1195	.1011	.3536	.1744	.0645
Early Warning	1	6	.0311	.0762	.0783	.0929	1.0	.1604	.0507
Electronic Warfare	1	5	.0197	.0483	.0496	.0965	.3375	.1665	.0441
Carrier ASW	1	5	.0508	.1245	.1279	.1092	1.0	.1885	.0694
Helicopter ASW	3	0	.0575	.1883	.1447	0	0	0	.0392
Maritime Patrol	2	7	.2210	.8737	0	.3047	.9170	0	.2476
LAMPS MK I	3	0	.0628	.2057	0	0	0	0	.0430
LAMPS MK III	3	0	.1141	.3741	0	0	0	0	.0780
Electronic Warfare	1	7	.0337	.0826	0	.0883	.3089	0	.0510
Force Support Jet	1	7	.1004	.0852	0	.0276	.0829	0	.0773
Force Support Prop	2	7	.1004	.1263	0	.0276	.0829	0	.0773
Force Support Helo	3	0	.0708	.2919	0	0	0	0	.0483
Air Wing Staff	1	1	.3972	0	1	.5794	0	1	.4550

Pipeline Key
1. Jet Aviator
2. Prop Aviator
3. Helo Aviator
4. RIO NFO
5. TN NFO
6. ATDS NFO
7. NAV NFO

TABLE C4

SUPPLEMENTAL FLEET REQUIREMENTS
Grade Table
(Auxilliary Matrix-Aux)

Subcommunity	Pilots			NFOs		
	05	04	03	05	04	03
Light Attack	0	12	18	0	0	0
Fighter	0	6	6	0	4	8
Medium Attack	0	4	0	0	2	0
Early Warning	2	2	2	0	2	0
Electronic Warfare	2	4	21	1	5	29
Carrier ASW	0	0	0	0	0	0
Helicopter ASW	2	10	4	0	0	0
Maritime Patrol	0	56	6	0	17	27
LAMPS MK I	0	6	0	0	0	0
LAMPS MK III	0	0	0	0	0	0
Electronic Warfare	4	20	117	3	12	140
Force Support Jet	25	96	247	6	10	47
Force Support Prop	2	10	38	2	4	23
Force Support Helo	16	25	276	0	0	0
Air Wing Staff	0	0	0	0	0	0

TABLE C5

TRAINING COMMAND REQUIREMENTS
(Training Command Matrix-TCØ)

Pipeline	Input/Output Ratio	05	04	Instructor Planning Factors	
				Pilot	NFO
Jet Aviator	1.405	22	44	.860	0
Prop Aviator	1.291	7	14	.443	0
Helo Aviator	1.347	7	14	.542	0
RIO NFO	1.791	1	2	.180	.255
TN NFO	1.77[illegible]	1	2	.118	.156
ATDS NFO	1.523	1	2	.070	.079
NAV NFO	1.426	1	2	.030	.088

TABLE C6

RDT&E AFLOAT AND OTHER REQUIREMENTS
(Matrix-OTH)

	AVIATORS				NAVAL FLIGHT OFFICERS			
Activity	Senior 05	05	04	03	Senior 05	05	04	03
RTD&E	26	26	120	189	5	6	31	75
AFLOAT	96	97	130	219	14	9	60	82
OTHER	289	289	710	634	91	91	243	312

TABLE C-7A

NETWORK DESCRIPTION
ACTIVITY: FLETT SQUADRON TOURS

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
2	36	NNN	NNN	OOO	NNN	NNN	NNN	NNN
3	36	NNN	OOO	OOO	OOO	NNN	OOO	OOO
4	36	NNN	OOO	OOO	OOO	OOO	OOO	OOO
5	36	NNN	OOO	OOO	OOO	OOO	OOO	OOO
6	24	OOO	OOO	OOO	OOO	OOO	OOO	OOO
7	12	OOO	OOO	OOO	OOO	OOO	OOO	OOO

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7B

NETWORK DESCRIPTION
ACTIVITY: FLEET READINESS SQUADRON

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	OO	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
3	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
4	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
5	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
6	24	OOO	NNN	NNN	OOO	OOO	OOO	OOO
7	24	OOO	NNN	NNN	NNN	NNN	NNN	NNN

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7C

NETWORK DESCRIPTION
ACTIVITY: TRAINING COMMAND

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	24	OOO	NNN	NNN	NNN	NNN	NNN	NNN
2	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
3	36	NNN	NNN	NNN	NNN	NNN	OOO	OOO
4	36	OOO	NNN	NNN	NNN	OOO	OOO	OOO
5	36	OOO	NNN	NNN	NNN	OOO	OOO	OOO
6	24	OOO	OOO	OOO	OOO	OOO	OOO	OOO
7	36	NNN	NNN	OOO	OOO	OOO	OOO	OOO

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS BARRED

TABLE C-7D

NETWORK DESCRIPTION
ACTIVITY: RESEARCH AND DEVELOPMENT

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
3	36	OOO	OOO	OOO	NNN	NNN	OOO	NNN
4	36	OOO	OOO	NNN	NNN	OOO	OOO	OOO
5	36	OOO	OOO	OOO	NNN	OOO	OOO	OOO
6	36	OOO	OOO	OOO	NNN	OOO	OOO	OOO
7	36	OOO	OOO	OOO	NNN	OOO	OOO	OOO

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7E

NETWORK DESCRIPTION
ACTIVITY: AFLOAT ASSIGNMENTS

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
3	24	NNN	000	000	000	NNN	000	000
4	24	NNN	000	000	000	NNN	000	000
5	24	NNN	000	000	000	NNN	000	000
6	24	NNN	000	000	000	NNN	000	000
7	24	000	000	000	000	NNN	000	000

NNN: PRECEDENT NODE IS BARRED

000: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7F

NETWORK DESCRIPTION
ACTIVITY: PROFESSIONAL DEVELOPMENT

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	24	OOO	NNN	NNN	NNN	NNN	NNN	NNN
3	24	OOO	OOO	OOO	OOO	NNN	NNN	OOO
4	24	OOO	OOO	NNN	OOO	OOO	NNN	OOO
5	12	OOO	OOO	OOO	OOO	OOO	NNN	OOO
6	12	OOO	OOO	OOO	OOO	OOO	NNN	OOO
7	12	OOO	OOO	OOO	OOO	OOO	NNN	OOO

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7G

NETWORK DESCRIPTION
ACTIVITY: OTHER

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	OO	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
3	36	OOO	OOO	OOO	OOO	NNN	NNN	NNN
4	36	OOO	OOO	OOO	NNN	NNN	NNN	NNN
5	36	OOO	OOO	OOO	NNN	NNN	OOO	NNN
6	36	OOO	OOO	OOO	OOO	OOO	OOO	NNN
7	36	OOO	OOO	OOO	OOO	OOO	OOO	NNN

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS PERMITTED

DISTRIBUTION LIST

(One copy to each addressee except as otherwise noted)

Director Technology Programs
Office of Naval Research (Code 200)
Arlington, VA 22217

Director Research Programs
Office of Naval Research (Code 400)
Arlington, VA 22217

Manager, Program in Manpower R&D
(12 copies)
Office of Naval Research (Code 450)
Arlington, VA 22217

Defense Technical Information Center
(12 copies)
DTIC/DDA-2
Cameron Station, Building 5
Alexandria, VA 22314

Science and Technology Division
Library of Congress
Washington, D.C. 20540

Commanding Officer
Naval Research Laboratory
Code 2627
Washington, D.C. 20375

Psychologist
Office of Naval Research Branch Office
Building 114, Section D
666 Summer Street
Boston, MA 02210

Psychologist
Office of Naval Research Branch Office
536 South Clark Street
Chicago, IL 60605

Psychologist
Office of Naval Research Branch Office
1030 East Green Street
Pasadena, CA 91106

Long Range Planning Group
Office of the CNO (Op-00X)
2000 North Beauregard Street
Alexandria, VA 22311
Attn: CDR W. A. Earner

Head, Research, Development, and
Studies Branch
Office of the DCNO(MPT) (Op-115)
G836 Arlington Annex
Washington, D.C. 20350

Headquarters U.S. Marine Corps
Code MPI-20
Washington, D.C. 20380

Program Administrator for Manpower,
Personnel, and Training
HQ Naval Material Command (Code 08D22)
678 Crystal Plaza #5
Washington, D.C. 20360

Director, Decision Support Systems Division
Naval Military Personnel Command (N-164)
1818 Arlington Annex
Washington, D.C. 20370

Assistant for Evaluation, Analysis, and MIC
Naval Military Personnel Command (N-6C)
Department of the Navy
Washington, D.C. 20370

Director, Research and Analysis Division
Navy Recruiting Command (Code 22)
4015 Wilson Boulevard
Arlington, VA 22203

Technical Director (5 copies)
Navy Personnel R&D Center
San Diego, CA 92152

Principal Civilian Advisor
on Education and Training
Naval Education and Training Command
NAS Pensacola, FL 32508

Head, Research Section, TME&R Branch
Chief of Naval Technical Technical Training
(Code 341)
NAS Memphis (75)
Millington, TN 38054

Department of Administrative Sciences
Naval Postgraduate School
Monterey, CA 93940
Attn: Dr. Richard S. Elster

Head, Manpower, Personnel, Training
and Reserve Team
Office of the CNO (Op-964D)
4A578, The Pentagon
Washington, D.C. 20350

Assistant for Personnel Logistics
Planning
Office of the CNO (Op-987H)
5D772, The Pentagon
Washington, D.C. 20350

Head, Long Range Manpower, Personnel
and Training Planning Branch
Office of the DCNO(MPT) (Op-110)
1832 Arlington Annex
Washington, D.C. 20350

Technical Director
U.S. Army Research Institute for the
Behavioral and Social Sciences
5001 Eisenhower Avenue
Alexandria, VA 22333

Mr. Francis E. O'Connor
Information Spectrum, Inc.
1745 South Jefferson Davis Highway
Arlington, VA 22202

Mr. Vincent Carroll
Wharton Applied Research Center
University of Pensylvania
Philadelphia, PA 19104

Prof. Irwin Sarason
Department of Psychology
University of Washington
Seattle, WA 98195

Dr. James F. Downs
Development Research Associates
11407 Hook Road
Reston, VA 22090

Officer in Charge
Human Resource Management Detachment
NAS Almeda, CA 94591

Director, Human Resource Management
Training Department
Naval Amphibious School
NAB Coronado, CA 92155

Department of Operations Research
Naval Postgraduate School
Monterey, CA 93940
Attn: Dr. Kneale T. Marshall

Military Assistant for Training
and Personnel Technology
Office of the Under Secretary of
Defense for Research & Engineering
3D129, The Pentagon
Washington, D.C. 20301

Personnel Analysis Division
AF/MPXA
5C360, The Pentagon
Washington, D.C. 20330

Program Director
Manpower Research and Advisory Services
Smithsonian Institution
801 North Pitt Street
Alexandria, VA 22314

Prof. Bruce M. Meglino
College of Business Administration
University of South Carolina
Columbia, SC 29208

Prof. J. Eric Fredland
Economics Department
U.S. Naval Academy
Annapolis, MD 21402

Dr. Michael Borus
Center for Human Resource Research
The Ohio State University
5701 North High Street
Worthington, OH 43085

Dr. Edwin G. Aiken
Code 309
NPRDC
San Diego, CA 92152

Commanding Officer
Human Resource Management Center
5621-23 Tidewater Drive
Norfolk, VA 23511

Commander in Chief
Human Resource Management Division
U.S. Atlantic Fleet
Norfolk, VA 23511

Commanding Officer
Human Resource Management Center
Naval Training Center Building 304
San Diego, CA 92133

Officer in Charge
Human Resource Management Detachment
Naval Submarine Base New London
P.O. Box 81
Groton, CT 06340

Officer in Charge
Human Resource Management Detachment
NAS Mayport, FL 82228

Director, Human Resource Management Department
Naval Aviation Schools Command
NAS Pensacola, FL 32508

Commanding Officer
Human Resource Management Center
Pearl Harbor, HI 96860

Commander in Chief
Human Resource Management Division
U.S. Pacific Fleet
Pearl Harbor, HI

Officer in Charge
Human Resource Management Detachment
Naval Base, Charleston, SC 29408

Commading Officer
Human Resource Management School
NAS Memphis (96)
Millington, TN 38054

Commanding Officer
Human Resource Management Center
1300 Wilson Boulevard
Arlington, VA 22209

Technical Director
Office of Naval Research (Code 102)
Arlington, VA 22217

Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics)
U.S. Department of Defense
Washington, D.C. 20301

Director, Human Resource Training Dept.
Naval Amphibious School
NAB Little Creek
Norfolk, VA 23521

Officer in Charge
Human Resource Management Detachment
NAS Whidbey Island
Oak Harbor, WA 98278

Officer in Charge
Human Resource Management Detachment
U.S. Naval Station Rota, Box 41
FPO New York 09540

Officer in Charge
Human Resource Management Detachment Naples
Box 3
FPO New York 09521

Commanding Officer
Human Resource Management Center London
Box 23
FPO New York, 09510

Commander in Chief
Human Resource Management Division
U.S. Naval Force Europe
FPO New York 09510

Officer in Charge
Human Resource Management Detachment Subic
Box 60
FPO San Francisco 96651

Officer in Charge
Human Resource Management Detachment Yokosuka
COMNAVFORJAPAN
FPO Seattle 98762

Deputy Assistant Secretary of the Navy (Manpower)
4E789, The Pentagon
Washington, D.C. 20350

Deputy Assistant Secretary of the Navy (Equal Opportunity)
4E775, The Pentagon
Washington, D.C. 20350

Director, Research and Data
Office of the ASD (MRA&L)
3B919, The Pentagon
Washington, D.C. 20301

The Principal Deputy Assistant
Secretary of the Navy (Manpower & Reserve Affairs)
4E780, The Pentagon
Washington, D.C. 20350

Director
Training Analysis and Evaluation Group
Department of the Navy
Orlando, FL 32813

Commanding Officer
Naval Training Equipment Center
Orlando, FL 32813

Library
Naval War College
Newport, RI 02940

Mr. Philip Bernard
B-K Dynamics, Inc.
15825 Shady Grove Road
Rockville, MD 20850

Director, Human Resource Management Division
Office of the DCNO(MPT) (Op-15)
Department of the Navy
Washington, D.C. 20350

Director, Human Resource Management Plans and Policy Branch
Office of the DCNO(MPT) (Op-150)
Department of the Navy
Washington, D.C. 23050

Dr. Gerald Thompson
Graduate School of Industrial Administration
Carnegie-Mellon University
Pittsburgh, PA 15213

Dr. Richard Hatch
Decision Systems Associates, Inc.
350 Fortune Terrace
Rockville, MD 20854

Mr. Ladd Greeno
A. D. Little, Inc.
Acorn Park, Building 35
Cambridge, MA 02140